

2013

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EIGHTH-GRADE STUDENTS READING NONFICTION LITERATURE
ON THE IPAD: AN EXPLORATORY CASE STUDY

by

VICTORIA MARIE CARDULLO
B.S. University of Central Florida, 1997
M.Ed. University of Central Florida, 2001

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the School of Teaching, Learning, and Leadership
in the College of Education
at the University of Central Florida
Orlando, Florida

Spring Term
2013

Major Professor: Vicky Zygouris-Coe

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ABSTRACT

The intent of this qualitative research study was to investigate the experiences of eighth-grade readers as they read nonfiction text on an iPad for academic purposes. Analysis of the Common Core State Standards (CCSS) calls for close reading requiring readers to interact with the text to create meaning (Fisher, n.d.). With this in mind, the researcher investigated reading strategies students used to support their reading as well as what role the iPad features played in the reading process. Several theoretical perspectives informed the framework for this study: (a) New Literacies theory, (b) transactional theory, (c) constructivist theory, and (d) metacognition theory. These perspectives focused on the reading comprehension strategies students used to facilitate reading comprehension while reading nonfiction text on an e-reader, specifically on an iPad. Data sources for this study included the following: (a) retrospective think alouds; (b) student questionnaire about iPad knowledge and experiences; (c) pre-study student interview; (d) post-study student interview; (e) Metacognitive Awareness of Reading Strategies Inventory (MARSI); (f) student observations; and (g) teacher interview. Pre-selection data for the collective case study participants were used to identify proficient readers who displayed confidence, competency, and control over text. The criteria used for participant selection included (a) reading skills using Lexile Levels, (b) MARSI survey, and (c) iPad use survey to determine prior knowledge of iPad. Three themes emerged in the collective case study that were directly related to the analysis. Students used a combination of (a) reading comprehension strategies, (b) nonfiction features, and (c) iPad features to support their reading of nonfiction on the iPad. Analysis of the data

revealed three distinct groups for which recommendations were made: (a) classroom teachers, (b) publishers, and (c) researchers.

To my inspiration



Thank you for always sending me pennies from Heaven...

ACKNOWLEDGMENTS

To my dissertation committee members, I am eternally grateful for your expertise and support throughout this process. Dr. Vicky Zygouris-Coe, dissertation chair, mentor, cheerleader, friend, your wisdom and unyielding support to see a diamond in the rough has allowed me to shine. Your mentorship has consistently forced me to move just a little beyond my comfort zone. Dr. Nance Wilson, the collaborative nature of our relationship has joined colleagues and friends beyond just research and writing. I will be forever grateful for Dr. Zygouris-Coe and Dr. Nance Wilson for their encouragement and inclusion of me as a researcher, writer, collaborator, colleague, and friend. Dr. Susan Wegmann, thank you for your expertise and support. Your feedback and guidance were a truly positive part of my dissertation. You were one of my biggest cheerleaders throughout this process. Your kind words and positive reflective notes often allowed me to see the depth of my writing more clearly. Dr. Bobby Hoffman, I remember having a conversation with Dr. Zygouris-Coe about my methodology a few years ago, after which I walked away feeling uncomfortable. She asked me what I was going to do about it, and I said, "Invite Bobby to be on my dissertation team." Your expertise and reputation challenged me to go above and beyond in regard to methodology. I knew without a doubt that if I ran into any trouble with the methodology you would have my back. Future candidates often ask me for my best dissertation advice. My only piece of solid advice is to carefully select their dissertation teams because they will have a positive impact on the direction and support throughout this arduous process. I am forever grateful to a top-rate team.

I would like to take the time to acknowledge several individuals who have been the support behind the scenes. John Cardullo, my husband and friend, your encouragement and support have helped me move beyond a notion of a dream. Your endless help and support propelled me to make a dream a reality. Thank you for the many things you have done because you knew they would make my life a little easier. It seemed at times as if the computer and I were tethered. Ashly Mackley, my daughter, friend, and often my sounding board; your endless support of my rhetoric and discussion helped me to process what I was researching. However, your strength and passion for life have shown me how important it is to follow ones dreams, no matter where they may take you. I am so proud of the women you have grown into. As you embrace the new ventures of the military with Chris, may your journey overseas be extraordinary, may you be immersed in the culture, and may your quest for life bless your body and soul. Megan Cardullo, my daughter, friend, and visionary, your passion, and desire are there. Never lose sight of the dream, as anything is possible no matter how long it may take. You told me once in order to do something new, you have to do something you have never done before no matter how hard it maybe. Megan may you venture out and leave your mark on the world. Chris Mackley, my new son-in-law, your humor and light heartedness helped to elevate the tensions and the demands of the research and dissertation. Debbie Snyder, my sister, I look at where we are and know mom is tossing pennies from heaven to tell us how proud she is of our accomplishments. She raised us to be independent, disciplined, and confident. Her values that she instilled in her children have led to the bond we share as sisters and friends.

Nancy Duxbury, your unyielding support, ready pick-me-up and nurturing attitude helped me to overcome so many obstacles throughout this process. To my “Diva” sisters--Debbie Snyder, Nancy Duxbury, Susan McNaulty, Linda Smith, and Sherrie Spencer--you have all gone through this with me every step of the way. Your support and friendship through this process have given me the strength to fulfill a lifelong dream. To Dr. Tammy Stafford, the endless phone calls, multiple text messages, and sometimes-incoherent emails are the things that have connected us through dissertation. However, friendship is what has propelled us beyond the pages of the text. I am eternally grateful for your friendship and support. Patrick Craanen, your wisdom, empathy, and support have given new meaning to friendship and collegiality. You, Pat, were often the reason for sanity when no sanity could be found. Thanks for making sense when nothing else made sense.

Finally, there are several individuals who supported me throughout this process that I would like to take the time to recognize personally. Donna Leinsing and The Toni Jennings Institute, your financial support and encouragement have propelled me into action as a researcher and advocacy for students with disabilities. Sherron Roberts, the impact your words and emails have had on me are numerous. The pick-me-ups, encouraging emails, and positive inflection have all challenged me to move beyond mediocre. I want to be the diamond you see. I want to challenge myself to be the person you view. Thank you. Kalena Davis, graduate assistant and friend, thank you for all of your help in making sense of the data and the endless sticky notes. You will go far with your attitude and passion for teaching. Finally, my editor, Mary Ann Lynn, you get me.

You often know what I am thinking before it is even clear to me. Your professionalism and support helped to polish the diamond in the rough.

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CHAPTER 1 THE PROBLEM AND ITS CLARIFYING COMPONENTS

Introduction

The 21st century brought technological advancements to the forefront of education that resulted in diverse, globalized, and complex learning (Kellner, 2006). Digital literacy demands have increased throughout all grade levels with the shift to focus on Common Core State Standards (CCSS). These standards represent a set of expectations for student knowledge and skills that all high school students must master to succeed in the 21st century global economy (Coiro & Kennedy, 2011). New literacy demands require a more sophisticated reading in which students are expected to “read and comprehend progressively more complex text” (Zygouris-Coe, 2012, p. 42) that has an increased emphasis on nonfiction. As early as the primary grades, CCSS require students to be efficient in online navigation to locate, synthesize, and communicate information or facts. In Grades 3-5, there has been a sharp increase in digital literacy demands, and students have been expected to manage, analyze, and synthesize multiple strands of print and digital information presented simultaneously.

Literacy demands have increased and changed as the technological capabilities of society have expanded to stay competitive with other nations, and these changes are compounding specific challenges already associated with adolescent reading. For example, text structure becomes more complex as the length and variety of required reading increases. Adolescents are users of technology in a time when reading is experiencing an explosion of alternate texts that vary in content and readability from print

text. Digital text incorporates multimedia as well as electronic options, features and/or other elements, e.g., built in dictionaries, text to speech, and physical keyboards, direct downloading of e-books, screen size, resolution, size of device, and weight and digital annotation. Word complexity, sentence structure, and graphic representation add an additional layer of complexity as well as an increase in contextual challenges. New Literacies require new knowledge, skills, and dispositions for learning in the 21st century. Schools are expected to keep pace with the fast changing technology and the skills needed for such success are not well defined.

Purpose of the Study

The purpose of this study was to investigate the experiences of eighth-grade readers as they read nonfiction text on an iPad for academic purposes. Analysis of the CCSS calls for close reading, reading that will require the reader to interact with the text to create meaning (Fisher, n.d.) With this in mind, the study was conducted to investigate reading strategies students used to support their reading as well as what role the iPad features played in the reading process. To date no research has targeted the identification of reading strategies on electronic devices for academic reading. Therefore, the question was whether those same strategies prove useful when reading nonfiction text on an e-reader. It was my intent to capture what the students were actually doing as they interacted with the iPad to read and comprehend nonfiction text in an eighth-grade social studies classroom using think alouds and observation to observe students' interaction with nonfiction text features such as table of contents, index, glossary, types of print, as

well as photographs, labels, and keys. It was also my intent to identify reading comprehension strategies adolescents used to support their reading comprehension.

Although researchers have demonstrated the need for strategic reading (Chall, 1996; Collins, 1994; Serran, 2002), the extent to which and how it occurs as students use e-readers to read text has yet to be researched. Rosenblatt (1991) stated that nonfiction text requires the reader to take a different stance. This stance causes readers to interact with the text differently than if they were reading a fictional text for pleasure. Nonfiction text requires the reader to slow down, reread, and locate information. Text knowledge, structure, organization, and language demands present readers with additional challenges. Nonfiction text often has content that is unfamiliar to the reader as well as structure that varies. Kletzien (1991) observed that before-, during-, and after-reading comprehension strategies can provide average and struggling readers with the scaffolding necessary for reading advanced text material. The question was whether those same strategies are still applicable when reading nonfiction text on an e-reader. It is important for classroom teachers to understand how students' use of strategies might affect student comprehension on e-readers.

Research that was currently being conducted using digital literacy at the time of the present study looked through the lens of online reading and not specifically reading and comprehending text using e-readers (Coiro, 2011; Kamil, Intrator, & Kim, 2000; Leu, Kulikowich, Sedransk & Coiro, 2009). Understanding the complexity of reading in a digital environment would make it possible for classroom teachers to teach specific strategies for reading and comprehending text in digital environments. Electronic

textbooks will look different from a traditional textbook, which usually includes a combination of two types of media, print and two-dimensional graphics (Leu, Kinzer, Coiro, & Cammack, 2004). Electronic textbooks offer digital text that integrates a range of multi-media formats, animated symbols, audio, video, and interactive tables.

Overview of the Issues

The RAND Study Group (2002) stated reading comprehension consists of three elements: (a) the reader (b) the text, and (c) the activity or purpose of reading. RAND posited that these elements are interrelated and are shaped by the social and cultural context in which reading occurs. For example, home environment and socioeconomic status can influence the level of experience and competency a student displays.

Foundational skills also affect the level of interaction of text, word recognition, fluency, and vocabulary knowledge, which can impede the ability to understand what, is being read.

Reading comprehension has been defined by various researchers over the years (Durkin, 1978; Harris & Hodges, 1995; RAND, 2002); all research has shown that good readers activate their schema and engage in metacognition when they read or construct meaning from text. The CCSS require readers to engage critically with text, gather evidence to support their assertions across sources, and develop transferable and deep meaning from text. The progressive development of reading comprehension across grade levels and through close reading is of importance to all as being able to read and comprehend increasingly complex text is a prerequisite to success in college and career.

Currently, it is projected that 80-90% of reading standards related to the CCCS for Language Arts will require text dependent questions for close analytical reading. Text dependent analysis questions are more specific, as they do not require information or evidence outside the text. Students are required to gather evidence, have specific text-based knowledge and insight about text reading. Close reading is a reading strategy that aids students in gathering knowledge and key details to support their findings based on the text. The CCSS state that close reading should be at the heart of classroom instruction. Strong readers achieve comprehension because they are able to use certain comprehension strategies to relate the text to what they already know (schema) and apply corrective strategies when meaning breaks down (Levin & Pressley, 1981).

The National Reading Panel (2000) stated that comprehension strategies such as comprehension monitoring are specific cognitive procedures that guide readers to become aware of how well they comprehend what they are reading. Comprehension monitoring signals to the reader that something is not working (Taylor & Frye, 1992). Taylor and Frye identified a few corrective strategies readers use as they process what they are reading. They stated that students often identified confusion when reading text and could often be seen rereading a sentence, phrase, or paragraph; or using look backs or forwards in the text to gain clarity.

Currently, there is a sense of urgency for adolescent readers to display college and career readiness. Changes in technology and alignment of the CCSS have propelled a greater emphasis for students to become college and career ready. Changing literacy tasks such as reading on-line: text, newspapers, journals, blogs, as well as participation in

virtual discussions and classroom presentations are presenting new challenges in the 21st century (Meltzer & Hamann, 2005). These changes require students to digitally read and interact across genres, cultures, and centuries and to read complex literary and informational text independently and proficiently.

Technology places a large demand on individual literacy skills such as learning, comprehending, and interacting with the text in a meaningful way (Coiro, 2003a), and little is known about how to analyze and teach the needed technology skills (RAND, 2002). Afflerbach and Cho (2009) expressed the belief that hypertext and Internet reading require readers to apply some of the same strategies that often work in traditional forms of reading. They cautioned, however, that the reader-text interaction within the hypertext might become more complex and demanding. Schwartz, Anderson, Hong, Howard, and McGee (2004) showed that text features and text format influenced the product and process of comprehension with hypertext and added an additional plurality to the task of reading for comprehension on the iPad. Electronic text that incorporates hyperlinks or hypermedia can support reading comprehension, yet it can also introduce some complications to reading comprehension, because its use can require skills and abilities beyond those required for comprehension of conventional print. Results from this study, although non-generalizable, may support new research on the integration of iPads and may more broadly assist in identifying the new knowledge, skills, and dispositions needed for learning in the 21st century. Therefore, the purpose of this qualitative case study was to explore (a) how eighth-grade students used the iPad to read

and comprehend nonfiction text in a social studies classroom and (b) what iPad features students used to support or enhance the reading process in an academic environment.

Background of the Study

Apple introduced the iPad to the world and placed it on sale in April of 2010. The iPad is a multimodal tablet that also serves as an e-reader, and a multi-touch display screen and virtual onscreen keyboard used to control this device. Though the iPad has many purposes, its educational purpose was explored in this research. Within three months of the iPad's introduction, Steve Jobs announced five million e-books were downloaded through iTunes. That equates to 2.5 books for every iPad sold (until that date) (Kolakowski, 2010). The introduction of the Apple iPad to academic environments throughout the world created three unique areas of innovation: electronic text, e-readers, and multimodal availability. Multimodal is defined as semiotic resources of image, onscreen key board, animated movement, sound, speech to text, and writing (Jewitt, 2002). The newness of this innovative tool created a unique phenomenon that has had very little research to support it in the educational environment.

Many schools throughout the nation have begun piloting studies that introduce iPads into the school environment with little or no understanding of the effects it will have upon students. Electronic text incorporates features exclusive to e-readers: hypermedia links, which allow for ease of navigation, search capabilities, annotation tools, flexibility of spatial layout, portability, and ease of use (Bush & Cameron, 2011). What remains unknown is how these features impact student learning. In a multimodal

format like the iPad, there are additional features that allow the reader to explore connections outside the text including hyperlinks such as virtual field trips, electronic resources on the Internet, videos, documentaries, and experts in the field.

Coiro and Dobler (2007) suggested that the Internet might require new features of online comprehension that move beyond those required to comprehend print. The iPad has features of an e-reader as well as innumerable resources for the Internet. This allows the reader to switch from one text to another (Sheppard, 2011). For these reasons, an exploratory approach in the present research sought to investigate adolescent readers' use of metacognitive reading comprehension strategies while reading nonfiction text on an iPad in a social studies class. Social studies was chosen as a content area because there is a high correlation between reading strategies used for reading nonfiction text and content area reading. Moore, Moore, Cunningham, and Cunningham (2003) stated that learning in any content area requires reading and writing skills. Therefore connecting literacy learning to the content areas can reinforce positive transference of reading strategies.

Statement of the Problem

In order for students to become fully literate in today's world, they must become proficient in the New Literacies of the 21st century technologies (International Reading Association Position Statement, 2009). The problem is that New Literacies require new knowledge, skills, and dispositions for learning in the 21st century moving critical literacy beyond the contemporary view of literacy to include the knowledge and skills needed for multiliteracies. Research conducted prior to this study has focused on gaining knowledge

and multiple perspectives on the development of multiliteracies when using the Internet. Results from this study were intended to add to the existing body of knowledge on the topic as well as guide future research. This research could be instrumental in the identification of specific strategies related to multimodal reading with e-readers. The results could lead to the development of a theoretical framework for effective use of e-readers with adolescents for academic purposes, and it could guide teachers' instructional decisions as e-readers become more prevalent in classrooms.

This presents a unique problem as technologies are evolving faster than research can support them. Technologies are emerging and researchers do not know how they are the same or different from online reading processes regarding skills and strategies needed for comprehension. For example, students searching for meaning with print text would skim and scan the text looking for a specific word or phrase. They might look at text structure or make connections between the text and their prior knowledge on the topic. In contrast, students reading electronic text on the Internet, would create a Google search for a specific term; and in an electronic text, they would use the find function. These strategies serve the same purpose, yet all look slightly different. Leu and Kinzer (2000) stated that reading and writing are very different in a digital environment such as the Internet. For example, decoding in a print-based text involves decoding the alphabetic characters, charts, pictures, and graphs to make meaning. Decoding for comprehension on the Internet includes all of the same print-based decoding strategies, yet additional decoding of the strategic use of color is needed. Various colors of text indicate hyperlinks to additional text and graphs that are embedded to support the reading (Leu,

Kinzer, Coiro, & Cammack, 2004). In this study, I investigated the experiences of eighth-grade readers as they read nonfiction text on an iPad for academic purposes. Reading strategies and the role of supportive iPad features in the reading process were explored. The focus of this research was to explore students' learning behaviors when using emerging technologies for educational practices.

The iPad is a new phenomenon within the academic environment, merging the innovation of electronic text, e-reader, and multimodal function. Although current researchers have only recently begun to look at the iPad in an academic environment, schools in the United States have already invested in the iPad for classroom use. Many institutions are piloting programs using 1:1 initiatives, and other schools are using a set of devices that can be checked out on rolling carts. The integration of iPads has become as diverse as the device itself in academic environments ranging from the use of APPS to support learning, e-readers for reading, as well as a tool for research. The problem was that many schools are experimenting with a device that has not been fully integrated into the curriculum and or classroom. Though early research on the Kindle could be used to support academic use, the additional features afforded on the iPad make it worthy of a primary investigation.

According to the Apple Corporation, over 55 million iPads were sold across the globe by 2012. Although a large percentage of the global population have engaged in digital reading, this is not necessarily true for adolescent readers. Technologies are evolving faster than researchers can carefully research the literacy demands placed upon the students. McEneaney (2003) stated it is not clear how the process of online text

impacts the pedagogical practices of literacy, learning, and instruction. This same implication is true for multimodal text, as students strategically process the information they read to acquire the skills mandated by the CCSS for the 21st century.

Theoretical Framework

Several theoretical perspectives informed the framework for this study: (a) New Literacies theory, (b) transactional theory, (c) constructivist theory, and (d) metacognition theory. These perspectives were used to focus on the reading comprehension strategies students are using to facilitate reading comprehension while reading nonfiction text on an e-reader, specifically on an iPad.

New Literacies Theory

The first theoretical perspective that informed this research was that of New Literacies. Currently, technological changes are defining literacy (Best & Kellner, 2001; Kamil, Interator, & Kim, 2000; Kamil & Lane, 1998; Leu, 2000; Reinking, 1998). Leu (2002) stated that never before have so many possibilities for literacy within the realm of technology been developed in such a short period of time. Due to the explosion of technologies and the shift from book page to computer screen, the form and function of literacy has changed and technology has been the driving force. Leu (2001) echoed the change in literacy, stating that literacy is constantly changing; it is no longer static print in a text. Students are using multimodal tools to develop literacy skills rather than merely consuming content. New Literacies require new knowledge, skills, and dispositions for

learning in the 21st century. This presents a unique challenge, as technologies are evolving faster than research can support them. The framework for New Literacies will provide the lens for this study as New Literacies are grounded in multiple theoretical perspectives including sociocultural theory, cognitive theory, reading comprehension theory, and information theory. They are complex, multimodal, and are currently viewed using multiple perspectives (Leu, 2001). The fundamental tenet of New Literacies is that complexity has shifted the way digital comprehension is viewed, moving it into the realm of reading (Coiro, 2003a). Digital literacies will require multiple perspectives due to the complexity of digital technologies (Alvermann, Moon, & Hagood, 1999; Baker, 2010; Cop & Kalantzis, 2000; Gee, 2005; Leu, Kinzer, Coiro, & Cammack, 2004; The New London Group, 2000; Warschauer, 1999). Hartman, Morsink, and Zheng (2010) believed that the foundational literacies would be insufficient to fully utilize the Internet as a reading and writing communication tool, and researchers must look at multiple perspectives. A dual-level theory of New Literacies was developed (Leu et al., forthcoming) using upper and lower case letters to differentiate “New Literacies” from “new literacies.” New Literacies is the broader of the two concepts and provides an umbrella for the multiple new literacies, which are subsets of it (Leu et al., forthcoming). New Literacies builds on foundational literacies that include word recognition, comprehension, inferential skills, and reasoning.

Researchers and practitioners have moved beyond the technology aspect of the Internet into the context of reading, writing, composing, and creating. This change has resulted in the Internet being framed as a literacy issue (Leu et al., forthcoming).

Researchers have viewed New Literacies as important new strategies essential for online reading comprehension (Leu et al., forthcoming; Leu, Kulikowich, Sedransk, & Coiro, 2009; Leu & Reinking, 2005). This new literacies theory includes multimodal literacies in online media environments and integrates a range of multimedia formats including audio, video, interactive tablets, and virtual environments. Many researchers have begun to connect theoretical views and adapt strategies, which already exist in traditional text in order to forge digital pathways into online reading comprehension environments (Castek, 2006; Coiro & Dobler, 2007; Zang & Duke, 2008).

The framework of New Literacies provided the lens in this study through which the dual level theory using lower case new literacies was explored. The narrower concept of New Literacies, which was of primary interest in this study, focused on the ever-changing technology as well as researchers who have been exploring these nuances.

Transactional Theory

A second theoretical perspective that informed this research was that of transactional theory. The relationship between literacy and technology is transactional (Leu et al., 2004). Transactional theory is the notion that meaning is produced in transactions between the reader and the text and the ability. Rosenblatt (2004) stated, “Every reading act is an event, or a transaction involving a particular time in a particular context” (p. 1369). Reinking (1998) observed that electronic text that is highly interactive and engaging is transforming the way students are thinking about literacy. In other words, readers are more engaged with hypermedia because it promotes a more

active role to reading. Meaning does not reside in the text; rather, it develops during the transaction between the text and the reader. Reinking (1998) stated that not only was technology transforming the form and function of literature, but that literature, in turn, was transforming the form and function of technology.

Rosenblatt (1986) argued that the meaning of the text lay not in the text itself but rather in the interaction between the reader and the text. Rosenblatt's Transactional Theory (1986) of reader response was important to this study because the core foundation of transactional theory is the notion that meaning is produced in transactions of the reader and the printed text. "Literacy is the state of being able to participate fully in a to-and-fro interplay between the person and the text" (Wegmann, 2010). In other words, the stance the reader takes will influence the transactive role of the reader, but what the "to-and-fro" will be like between the person, the text, and the device is currently unknown.

Text structure has been an important variable in the investigation of reading comprehension. Therefore, the multidimensional text structure of the e-readers is equally important, as it represents a virtual structure of reading. McEneaney (2002) aligned transactional theory with transactional theory of hypertext. He defined three types of structures: (a) virtual structure, specifically what is possible; (b) episodic structure, outcomes of specific reading transactions or the choices the reader makes during reading; and (c) emergent structure, broader shared structures that emerge from accumulated transactions of multiple readers. These structures represent the text as individual readers' experiences.

Central to Rosenblatt's (2004) transactional theory is Linguistic Experiential Reservoir (LER) which posits that language and experiences are the transaction that a reader brings to the reading of a text. The transaction between the text, the reader, and the device are complex and made up of many different elements and actions that are in constant interface with each other based on the language and experiences of the reader. Readers construct different meanings from the same text based on their experiences and current knowledge of reading. Technology and literacy transact in multiple ways and mutually influence one another (Leu, 2000). For example, earlier studies by Labbo, Murray, and Phillips (1995-1996) found teachers were transforming existing technologies in the classroom to meet their literacy needs, e.g., "IBM Writing to Read Labs" were created to transact technology and literacy. The vision for literacy has been keeping pace with the evolution of technology.

Currently, the iPad is being used for a multitude of literacy needs that look different from past practices, e.g., email, Wikispaces, Skype. Its use in the classroom has created a vortex for endless transformations to the form and function of literacy. Furthermore, Reinking (1998) stated that the relationship between literacy and technology is transactional. Therefore, in this study, the concept of transactional theory was applied to explore the transaction between the text, the reader, and the device as students read nonfiction text.

Constructivist Theory

A third theoretical perspective that influenced this study was that of constructivist theory. Constructivism, which is defined as the construction of understanding and knowledge of the world through interaction, experiences, and reflection, was derived from the work of several researchers (Bruner, 1961, 1980; Piaget, 1964; Vygotsky, 1962, 1978). This research, however, was focused primarily on Vygotsky's 1962 and 1978 work. The major theme of Vygotsky's theoretical framework is the critical need for social interaction for the development of cognition. Vygotsky stated "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people and then inside the child" (1978, p. 57). Through these exchanges, learners may change or discard the information based on purpose. The experiences and context in which the learning is embedded is critical to the learners' understanding. Students are active creators of knowledge by questioning themselves and the strategies they are using. The construction of meaning gradually moves them to become experts in their learning. Cambourne (2002) suggested that the core theoretical assumptions for constructivism could be expressed in three overlapping yet separate propositions:

1. What is learned cannot be separated from the context in which it is learned.
2. The purposes or goals that the learner brings to the learning situation are central to what is learned.
3. Knowledge and meaning are socially constructed through the processes of negotiation, evaluation, and transformation. (p. 26)

Vygotsky's Zone of Proximal Development (ZPD) is the difference between what students can achieve on their own and what they can achieve when acting with the support of others and or artifacts (Vygotsky, 1986). Vygotsky (1986) viewed the reading and writing process as a social aspect essential to the development of knowledge.

Constructivism is a higher-order, socially constructed physiological function.

Constructivist theory was important to the theoretical framework of this study because learning is often socially constructed within the new literacies. The construction of knowledge will become increasingly more dependent on social learning and the learning opportunities between and among students (Leu et al., 2004). Social constructivism views motivation as both intrinsic and extrinsic because the learner to understand the learning process actively constructs the social learning. Social learning plays an important role in the exchange of new skills and strategies as students take on active roles as they interact with their peers for learning. Social learning is the bridge or transition between behaviorist theory and cognitive learning theory (Ormrod, 1999). Students can learn a great deal simply by observing behaviors of others through modeling. Social learning is the exchange of new skills and strategies needed to interact within an increasingly complex and continually changing technology for information and communication. Social learning is not only important for how information is learned but it is critical to the construction of information. When students encounter something new, they forge connections to schema of previous ideas and experiences (Piaget, 1964).

Learners either accommodate or assimilate this new information into their schema or their file cabinet in their head. Piaget felt that one's schema grows and expands as new

knowledge is acquired; this process is very similar to Rosenblatt's concept of linguistic experiential reservoir (LER).

It is important to realize that reading throughout the last decade has changed. The explosion of technology has created opportunities for reading on a tablet, e-reader, or cell phone. Although the "look" of reading has changed, its purpose has remained the same. The primary goal of this study was to determine how students construct meaning in a digital environment. Pearman (2008) identified the construction of understanding as "comprehension of written message" (p. 601). Based on sociocultural theory (Vygotsky, 1986), the readers' characteristics play a large role in how children learn to read. Several characteristics key to Rosenblatt's theory are important to the development of student learning, stance, language, and experiences and evocation that occur when the reader and the text merge. The stance will affect the transaction of the reading experience (efferent-aesthetic). Language and experiences, which Rosenblatt identified as linguistic experiential reservoir, or LER is important because it shapes the way in which the reader interprets the text-based on experiences. Finally, evocation occurs when the reader and the text come together, bringing together authors' meaning, and the readers' LER. The computer offers an effective means for implementing constructivist strategies (Driscoll, 1994). Driscoll believed that students should learn to solve real world problems through a collaborative process. Collaboration provides students with the opportunity to share their learning. Collaboration also provides multiple perspectives and enhanced understanding of learning. Because knowledge is dynamic and always changing due to the abundance of easily accessible information, students must learn to manage their own

learning. Student-centered learning or discovery learning provides opportunities for obtaining new information and transferring, and constructing information for learning purposes. This process moves learners through assimilation, incorporating new experiences into old experiences or accommodation and reframing prior knowledge. In this study, the constructivist theoretical framework was applied to explore the social interactions, understanding, and knowledge of the text as students read nonfiction text on the iPad.

Metacognition Theory

The final theoretical perspective that influenced this research is that of metacognition theory. Metacognition theory is important to this study because cognitive and aesthetic changes to text presented digitally present new challenges to comprehension (Coiro, 2003b) and may require a more sophisticated strategy process. Reading comprehension is a complex process in which students metacognitively think about the cognitive process involved in reading (Baker, 2002). Metacognition consists of both active monitoring and consequent regulation. Flavell (1976) defined the framework for metacognition as deliberate, conscious, foresighted, and purposeful, directed at accomplishing a goal or outcome. Marzano et al. (1988) described metacognition as the process that guides readers as they think through a problem, making strategic decisions. The goal of metacognitive strategies is to make thinking visible to oneself and others to achieve a learning outcome. It is the understanding of what the mind is thinking during learning that helps strengthen and improve cognition.

Grounded within the theoretical framework of metacognition are the three types of knowledge needed for strategic reading: declarative, procedural, and conditional (Paris, Wasik, & Turner, 1991). Knowing these three concepts may help students to exert metacognitive control over their learning. Hartman et al. (2010) cautioned that students need to develop additional metacognitive strategies that will propel their reading in an online environment. They require additional strategies to evaluate content, challenge authorship, and set goals. Current multimodal devices such as the iPad are already bringing the reader beyond the linear text with embedded hyperlinks, comments, graphs, charts, and videos. These resources can be a distraction to struggling readers who lack the ability to read for meaning. These elements constitute the metacognitive, self-regulated aspect of student learning. Multimedia systems depend not only on students' individual system of knowledge but also on their ability to successfully allocate and monitor cognitive resources as they navigate the text (Conklin, 1987).

The metacognition framework provided a lens for this study through which I was able to examine students' reading comprehension when reading with a digital reading device. Researchers have learned that reading is a sophisticated process that moves readers beyond skimming and scanning. Readers engage in a complex metacognitive process in which they analyze, evaluate, and infer meaning of text derived by the author. Consistent with Flavell's (1997) thinking, metacognitive strategies will be considered advantageous to reading comprehension on the iPad. The complexity of Flavell's (1997) metacognitive process of analyzing, evaluating, and inferring will move students beyond

task-oriented cognition and allow them to activate domain specific task analysis of digital comprehension.

In summary, the researcher drew upon several theoretical perspectives to focus on how students use the iPad to read nonfiction text in academic environment as well as the role features of the iPad play in the reading process. These theoretical perspectives were used to investigate the iPad as a reading tool in the classroom. Additionally, students' interactions with the device were interpreted to possibly expand on new knowledge, skills, and dispositions for learning in the 21st century as they interacted collaboratively with the device and the text for meaning.

Research Questions

This collective case study was designed to investigate the following primary research question: How do eighth-grade students read nonfiction text using the iPad?

According to qualitative research, sub-questions use the phenomenon of the central research question and divide it into subtopics for investigation (Creswell, 2007). The following sub-questions were addressed in this study to answer the primary research question:

1. What reading comprehension strategies do eighth-grade students use to read nonfiction text using the iPad?
2. What role do the iPad features play in the reading process?

Definition of Key Terms

The following terms and phrases were significant for the purpose of this study:

Adolescent literacy. Occurs between fourth and 12th grades. It can be organized into five elements: word study, fluency, vocabulary comprehension and motivation (Boardman et al., 2008).

Comprehension. “The process of simultaneously extracting and constructing meaning through interaction and involvement with the written language” (Snow, 2002, p. 11) indicating that comprehension resides in a deliberate process that occurs as the reader actively engages with the text.

Concurrent think alouds. Asking direct questions while student is involved in the activity. This allows the researcher to access information from the student’s short-term memory.

Digital literacies. Multiple, multimodal, and multifaceted literacy of the 21st century; literacy that is complex and shifting (Leu, O’Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009).

Digital text. A combination of words and images displayed on an electronic device in which the text develops in a multi-linear direction.

Electronic book (e- book). An electronic representation of a print textbook (Smith, 2008).

Electronic reader (e-reader). “A dedicated, specialized device solely used for the purpose of reading an electronic book or textbook” (Smith, 2008, p. 12).

Hyperlinks. Links to locations within the dedicated e-document or to the external documents such as websites related to content (Allison, 2003).

Hypertext. A means of access to elements on a multimodal e-reader device, e.g., dictionary, hyperlinks, notes, search, highlight.

Metacognition. The process of thinking about thinking. This refers to readers' thoughts and the awareness of their thoughts as they engage in the reading process, allowing them the ability to monitor their understanding of text. Metacognition occurs when readers are aware of their comprehension processes and regulate the process to assure understanding (Wilson & Hayian, 2010).

Navigation. The ability to move within a closed or open environment.

Nonfiction Text. Work that asserts factual information or accounts to convey information. Genres of nonfiction text can be categorized as subgenres: i.e., narrative nonfiction, informational, and memoirs.

Retrospective think aloud. Questions asked after the completion of the activity, often used to support users' intent, and reasoning for their actions (Ericsson & Simon, 1993).

Strategic Reader. A reader who processes information effectively using a variety of strategies in constructing the meaning of text (Pasik, Wasik, & Turner, 1991).

Assumptions

The assumptions that underlie this research were as follows:

1. Participating students have minimum to no experience with using an iPad to read nonfiction text in a social studies classroom.
2. It was assumed that students have not read any scholarly material using an iPad over a period of time.
3. It was assumed that students would transfer reading strategies from reading print text to reading digital text.
4. It was assumed that interviewees would be honest in their responses.
5. It was assumed that the results of the study would be limited to the theoretical framework of this study.

Research Design

This study employed a collective case study approach to investigate the phenomenon using a variety of data sources (Baxter & Jack, 2008). A collective case study, which explored within and between cases, allowed the researcher to describe the experiences of eighth grade readers as they read nonfiction text on the iPad (Yin, 2003). Supported by Yin (2003), case studies are used to describe or explore events or phenomenon in the context of the event as it is naturally occurring. Furthermore, Yin (2003) asserted that case studies are the preferred method of research when researchers use “how” or “why” in their research questions. For these purposes as well as the

emerging research and issues related to e-readers and educational practices, the naturalistic approach, employing a collective case study method is considered by this researcher to be most aligned with the purpose of this study which was to document in-depth students' experiences and interactions with the iPad for reading nonfiction text.

Pressley (2000) noted the need for focused work on reading strategies from start to finish. More recently, Afflerbach and Cho (2009) stated, " This methodology is well suited to the task of providing descriptions of strategies of traditional reader-text interactions as well as more recently investigated acts of literacy involving readers with multiple texts and readers reading in Internet environments " (p. 74). Reading comprehension strategies cannot be fully understood unless the reader is actively engaged in the reading process. Therefore, this research targeted the identification of reading comprehension strategies participating students used to read nonfiction text on an iPad. Students used retrospective think alouds, a form of reporting about the process of reading. This research guided and informed instruction so that developing readers could be assisted in becoming strategic.

Current research findings have revealed that more accomplished readers often have a higher verbal ability to articulate, and they are often more successful in choosing and using diverse reading strategies (Afflerbach & Cho, 2009). Efforts to describe and detail strategic work of the reading process often focus on accomplished readers, and this researcher selected accomplished readers as participants in this case study. This allowed the researcher to analyze the process of reading nonfiction text on an iPad and identify strategies the readers used to construct meaning from nonfiction text on the iPad.

Theoretical analysis of reading comprehension strategies can help predict what strategies good readers' use in particular reading situations as well as how and when they use them.

This research was conducted to investigate a phenomenological question related to how students use the iPad to read nonfiction text, what strategies good readers use and what features of the iPad support the reading process. Data sources for this study included the following: (a) retrospective think alouds; (b) student questionnaire about iPad knowledge and experiences; (c) pre-study student interview; (d) post-study student interview; (e) Metacognitive Awareness of Reading Strategies Inventory (MARSI); (f) student observations; and (g) teacher interview. The researcher used triangulation of data for the purposes of assuring completeness and confirming findings from different perspectives and overcoming the limitations of a single method of data collection (Campbell & Fiske, 1959; Denzin, 1978).

Delimitation

1. The research into reading nonfiction text using an iPad was delimited to eighth-grade students in a social studies classroom in a single charter middle school.

Limitations

The limitations with respect to research design, data collection, instrumentation, and analysis of data were as follows:

1. The nature of the study had inherent methodological limitations such as data quality and rigor, including validity and reliability.
2. The sample selection, which was purposeful, had limitations to the generalization from a sample to a population and was limited to an eighth-grade classroom at a charter school.
3. The sample size was small and was not necessarily representative of all populations (Creswell, 2002).
4. This study may be difficult to replicate, as findings may not be generalizable.
5. Research bias in a case study analysis can lead to overstating or understating findings (Merriam, 1998)
6. To avoid researcher bias, survey tools and interviews were crafted carefully (Boyce & Neale, 2006).
7. Interviews have limitations as they are not generalizable (Boyce & Neale, 2006).
8. Self-reported surveys are vulnerable to “over-rater or under-rater bias,” and there may have been a tendency for a student to respond with consistently high or low ratings (Isaac & Michael, 1995, p. 137).

9. Data collection using retrospective think alouds can cause cognitive overload of problem solving, and speaking may have been difficult for some students (Branch, 2000).
10. Data collection and analysis were focused on eight students who were purposefully selected as high-level readers to yield the most information for the research questions.
11. The selection of iBooks was limited due to the restricted availability of appropriate content related e-Book titles for download.
12. The role of the research had inherent limitations as the researcher had an extensive background in technology and literacy.
13. Absenteeism and mobility proposed inherent limitations for data collected for some of the participants.
14. There were limited potential research biases due to role of the researcher as a participant observer.

Significance of Study

This study was derived from (a) the newness of the topic of New Literacies, specifically, how students read and comprehend text using e-readers; and (b) the recent influx of e-readers in the classroom. Researchers have begun to investigate digital literacies (Coiro & Dobler, 2007; Lankshear & Knobel, 2003; Teale, Leu, & Labbo, 2002) and have determined that this research is still within the initial stages of development and discovery.

Exploration into digital text reading comprehension was needed, as a globally competitive economy has placed increasing demands on 21st century students. There was a limited body of research in the field of new literacies with multimodal devices. The researcher posited that important information could be obtained from listening to students as they engaged in the reading process using the iPad, and an exploratory study seemed most appropriate to conduct this exploratory study. Research conducted prior to this study was structured to gain multiple perspectives on the concept using an Internet focus. Results from this study could be added to the existing body of knowledge on the topic in determining the focus of future research. This research could be instrumental in the identification of specific strategies related to multimodal reading with e-readers. The results could lead to a theoretical framework for implementation which could guide professionals as e-readers become more prevalent in classrooms.

Organization of the Study

This chapter introduced the purpose of this study, which was to investigate (a) what could be learned from students as they apply strategies to read nonfiction text on the iPad and (b) the role iPad features play in the reading process. Additionally, the issues related to this research including a statement of the problem, purpose, and the background of the study were detailed. The theoretical frameworks of New Literacies, transactional theory, constructivist theory, and metacognition theory that inform the complexities of reading and learning with continually evolving technologies were presented. The chapter also provided an overview of the research question, research

design, limitations, significance of the study, and definitional terms. Chapter 2 contains a review of the literature related to reading comprehension strategies, metacognition, think alouds, dual literacies, new literacies research, e-readers, and skills needed for the 21st century. Chapter 3 describes the qualitative methodology used in conducting the research. Data sources for this study included the following: (a) retrospective think alouds; (b) student questionnaire about iPad knowledge and experiences; (c) pre-study student interview; (d) post-study student interview; (e) Metacognitive Awareness of Reading Strategies Inventory (MARSI); (f) student observations; and (g) teacher interview. An overview of the pilot study previously conducted is included, and data collection procedures as well as the role of the researcher and the classroom teacher are explained. Chapter 4 presents the analysis of the data. Results identifying individual findings using verbal protocols as identified by Leslie and Caldwell (2009) are displayed. Finally, in Chapter 5, the research findings are summarized, and implications for practice, research, and theory development are discussed.

CHAPTER 2 REVIEW OF THE LITERATURE

Introduction

The literature reviewed in this chapter has been organized to focus on topics that are particularly relevant to the investigation of adolescent readers' use of metacognitive strategies for comprehension of nonfiction text using traditional print based reading and digital reading. Furthermore, the state of critical issues related to print and digital comprehension was addressed. The remainder of the chapter has been devoted to three major topics: (a) reading comprehension, (b) reading comprehension using the Internet, and (c) reading comprehension using e-readers.

Keywords used to identify sources in the review included: metacognition, comprehension, constructivist, transactional, sociocultural, nonfiction, expository, adolescent reading, digital literacy, new literacy, e-reader, iPad, Kindle, and verbal reports. The majority of studies reviewed were empirical or exploratory. Several were identified as pilot studies and were often initiated as teacher research. A mixed method approach was used in several studies, and the qualitative dimensions of the research were emphasized. In reviewing research related specifically to e-readers, several studies were found to be exploratory and often used comparative research strategies to evaluate reading on the iPad versus the Kindle. Published research, white papers, reports, professional books, handbooks on research, and dissertations were also reviewed.

Critical State of Literacy

“To remain economically competitive the US must develop a highly skilled and adaptable workforce capable of meeting productivity demands and adjusting to the rapidly changing technologies and an increasingly global environment” (Bernanke, 2007). Currently, ACT researchers have shown that college and career readiness is highly correlated with college completion, yet of the 1.5 million high school graduates who took the ACT test in 2010, only 28% met all four career Readiness Benchmarks in English, mathematics, reading, and science. These troubling statistics indicated that fewer than one in four graduates were academically ready for college course work in all four areas without remediation.

It is important to note that the National Assessment of Educational Progress (NAEP) study showed improvement in literacy skills have not kept pace with the increasing demands for literacy in the workforce. In 2007, 26% of eighth graders performed below the basic level on the NAEP reading assessment. In 2011, the average reading scores for eighth graders did not change significantly.

Furthermore, Greene, and Winters (2005) wrote that only 70% of all high school students were expected to graduate on time with a regular diploma. The percentage of African American and Latino students was even smaller with only 60% expected to graduate on time. A recent report released by the Alliance for Excellent Education (Heller & Greenleaf, 2007) dealt with what was termed “a crisis” in American middle and high schools. The report indicated that one in four adolescents cannot read well enough to identify the main idea of a passage. The RAND Reading Study Group (2002)

stated that the challenge of reading comprehension has been heightened in the current education era, because students are expected to read text that is more complex.

Beginning in fourth grade through formal years of schooling, students spend the majority of time reading expository or informational text. Mandler and Johnson (1977) observed that simple exposure to informational text is not enough. Nonfiction text often has content used to inform the reader.

The National Center for Education Statistics stated reading scores have shown small gains for students in Grades 4, 8, and 12 since 1992, yet recent results show the numbers are not keeping pace with the rest of the world (NCES, 2010). For fourth grade, reading scores remained unchanged in 2009 with 38% of students at or above proficiency. The average score for eighth-grade students was increased by one point with 32% at or above proficiency levels. For 12th grade, only 33% of the population was at or above proficiency (NCES, 2010). Subgroups have also begun to narrow (Center on Education Policy, 2008), yet there are still significant gaps in low poverty and racial groups.

The results of the ACT and NAEP studies provide warnings that the United States must make major changes to the education system to ensure success in an increasingly global environment. To assure these changes The Common Core State Standards initiative, a landmark development for U.S. school reform drew upon the longitudinal results from ACT (2011) research. The results helped to identify knowledge and skills essential to post-secondary education and the workforce.

According to existing research, approximately eight million adolescent readers between fourth and 12th grades struggle to read at grade level (Biancarosa & Snow, 2006). The problem for these readers is not with readability but with understanding. Many students do not comprehend what they are reading. The National Center for Education Statistics (2003) warned that there are higher stakes for adolescent readers, i.e., retention and withholding of diploma, which create higher stakes for accountability and performance.

Critical literacy needs of the 21st century add an additional layer to the “rapidly changing technologies and an increasingly global environment” (Bernanke, 2007, p. xx). The 21st century economy will require employees to have strong communication skills, think critically and creatively as they problem solve and respond to the rapidly changing situations (Gomez & Gomez, 2007). Communities expect their graduates to be ready to thrive in the digital age of the 21st century, but the skills for such success are not well defined. Schools must do more to keep pace with the fast changing technology. They must embrace new designs transforming technology and learning. The No Child Left Behind Act of 2001 mandated that all students, regardless of race, ethnicity, gender, family income, geographical location or disability, be technologically literate by the time they finish the eighth grade. The problem is New Literacies require new knowledge, skills, and dispositions for learning in the 21st century. This requires students to have experiences and develop skills around the technology used in the classroom as well as technology used outside of the classroom.

Changes to graduation assessments have directly affected individual student performance outcomes. The new indicators for the Florida Comprehensive Assessment Test (FCAT) 2.0 stated that 20% of eighth-grade test items require a high cognitive complexity as well as synthesis across multiple texts. Nonfiction text will comprise at least 70% of the reading. Questions will require the individual to prove depth of understanding rather than breadth of concept. This migration of testing leads to new demands on students such as nonlinear print, text features and navigation across and within multiple text, all while addressing the complexity of the text. According to a memorandum from the Florida Department of Education (2010), the following e-tools will be available as resources for students as they take the FCAT 2.0 using computers:

1. Review--an e-tool used to mark items to review later;
2. Eliminate Choice--an e-tool used to mark through answer choices students wish to eliminate;
3. Highlighter--an e-tool used to highlight electronic text in a section or passage;
4. Eraser--an e-tool used to erase electronic highlighting or eliminate choice;
5. Help--an e-tool icon about the e-tools available (this tool brings the reader to a separate window through a hyperlink).
6. Notepad--an e-tool that allows the reader to type notes as they are reading
(Reading Only)

The complexity of the FCAT 2.0 is further compounded by test item specifications. In a 2011 update, it was announced that FCAT 2.0 would align more closely with the Next Generation Sunshine State Standards (NGSSS). There was to be a

stronger focus on nonfiction text, e.g., biography, autobiography, diaries, memoirs, journals, and essays and critiques. Informational text was to be used to problem solve, raise questions, provide information or to present new information about the subject matter.

In 2014, students will begin taking The Partnership for Assessment of Readiness for College and Careers (PARCC). This is another example of current testing that is moving in the direction of closer alignment with skills and strategies needed for 21st century college and career readiness. The PARCC closely aligned with the CCSS and makes better use of technology and assessment. Students will be required to respond to different text formats including audio, video, and multimedia. They will be required to read long passages, and half the test items will require analysis of the text through close reading. Close reading has been defined as a careful, purposeful reading and rereading of a text (Fisher, n.d.). The focus of close reading is on what the author has to say, the author's purpose, key vocabulary, and structural analysis to answer complex questions that are text dependent. Fisher related Rosenblatt's theory of Reader Response to close reading. He stated that Rosenblatt's Reader Response Theory is the transaction between the reader and the text. Fisher stated that an analysis of the CCSS delineates that the reader must justify their responses to the text, and this may be accomplished through close reading. There will be a significant amount of informational, nonfiction text with subgenres including memoirs, journals, and diaries. At the time of this study, 45 states plus the District of Columbia had adopted the CCSS.

Reading Comprehension Strategies

The most powerful means of improving reading comprehension and preventing comprehension problems, according to the RAND Study Group (2002), is good instruction of strategy application. More specifically, the National Reading Panel (2000) defined comprehension strategies as “an activity that students might engage in to enhance comprehension and repair it when it breaks down” (p. 17). A growing number of researchers have supported the teaching of specific strategies to enhance reading comprehension (Afflerbach & Cho, 2008; Baker, 2002; Coiro, 2003a; Coiro & Dobler, 2007; Miller, 1987; Palincsar & Brown, 1984; RAND, 2002). Miller (1987) noted that researchers have shown that students can be taught to use strategies to facilitate reading comprehension and that an increase in strategy use increases awareness and performance.

In the report of the National Reading Panel (2000), reading was referred to as the construction of the meaning of the written text through reciprocal interchange of ideas between the reader and the message of the text. The panel identified over 1,000 reading research studies and used the following criteria to narrow the scope of review: (a) quantitative, (b) experimental design, (c) causality between practice and outcome, and (d) large sample size. From the 1,000 possible studies, 203 were identified as meeting the criteria. The panel’s findings from these studies showed the need for cognitive strategy instruction, identifying 16 specific strategies that were proven effective and the need for teaching a variety of strategies in a naturalistic setting. Students trained using cognitive strategy instruction showed significant gains on measures of reading comprehension over students who were trained without strategy instruction. In this review, specific strategies,

e.g., comprehension monitoring, question answering, question generating, and summarizing, were found to be effective (National Reading Panel, 2000).

Metacognition

Researchers have been paying close attention to metacognition (Kuhn, 2000; Paris & Winograd, 1990; Schraw, Crippen, & Hartley, 2006; Whitebread et al., 2009).

Effective thinkers and learners take responsibility for monitoring and managing their thinking. This is extremely important to reading and new literacies. As students read for meaning, they are developing metacognition and self-regulation (Pressley, 2002). They are monitoring their comprehension, determining if meaning is breaking down, and applying corrective strategies. Nickerson (1988) believed metacognitive skills are identifiable and learnable and should include planning and assessment. The advent of New Literacies has forged a new cognitive monitoring issue that requires additional planning and assessment, checking for authorship, validating information, and moving to the next hyperlink, all of which may require additional or different strategies.

The metacognitive process needs to be explicit so that students become aware of purpose and goal of learning activity. An important goal for teachers is the support of student learning using scaffolding. This will allow the students to begin to analyze what they are thinking about rather than just focusing on their search for the right answer. Metacognition development takes time. Students must understand what is expected as they read for comprehension, and they must develop strategies. Weinstein and Mayer (1989) stated that students need to analyze where meaning is breaking down and decide

what additional information is needed to solve problems. This requires student self-questioning which Palincsar and Brown (1984) described as a metacognitive or comprehension monitoring tool. Researchers have explored techniques and strategies that are designed for teaching reading comprehension strategies in the context of group work and have concluded that the most well-known one is reciprocal teaching. Reciprocal teaching is a technique that fosters metacognition between learners. As a strategy, it incorporates interactive communication, which supports a scaffold instructional model of learning. Students are given the opportunity to assume the role of the teacher, using think alouds followed by discussion (Oczkus, 2003). This process aids students in becoming more reflective of their strategy use.

Palincsar and Brown (1984) conducted a series of studies to determine the effectiveness of reciprocal teaching based on the Vygotsky theory of social interaction in the development of cognition. Using control and treatment groups, Palincsar and Brown (1984) explained three theories that guided the framework for reciprocal teaching: (a) Vygotsky's (1978) zone of proximal development; (b) specialized teaching (Wertsch & Stone, 1979); and expert scaffolding (Wood, Bruner, & Ross, 1976). Palincsar and Brown used verbal recordings and transcripts of the reciprocal group as part of their data collection to record beginning, middle, and end of interventions. Findings indicated the interaction phase showed statistical significance leading the researchers to conclude that reciprocal teaching intervention led to dramatic improvement in student scores. Not only did scores improve, but students were also able to maintain the improvement. Students showed growth in reciprocal teaching and maintenance of strategy. The goal of

reciprocal teaching is for students to apply these strategies through metacognition. Participants in the study consisted of 37 seventh-grade students. Palincsar and Brown developed criteria for a purposeful selection of participants based on fluency and comprehension. Students were required to read at least 80 words per minute with only two miscues as well as comprehension scores at least two years below grade level with 40% accuracy on the experimental task. Of the 37 students, six were identified and assigned to the reciprocal teaching condition group. The researchers conducted their research over a course of 20 days. In a follow-up study, Palincsar and Klenk (1991) demonstrated that between 15 and 20 days of intervention could increase reading comprehension significantly from 30% to 80% accuracy. The National Reading Panel (NRP, 2000) found Reciprocal Teaching to be a highly effective approach using multiple strategies.

Also examining reciprocal teaching, Lysynchuk, Pressley, and Vye (1989) examined reading comprehension strategies using the reciprocal teaching method and what they uncovered were similar findings to the Palincsar and Brown study (1984). They looked at fourth graders ($n = 36$) and seventh graders ($n = 32$) who were proficient with word recognition but lacked reading comprehension. They used the four elements of reciprocal teaching: questioning, clarifying, summarizing, and predicting. Although no significant differences among groups were noted, there were significant program effects observed related to comprehension. The most significant outcome of this study was that students who received training in reciprocal teaching improved significantly based on pre- and posttest scores. Lysynchuk et al.(1984) found statistically significant

positive effects in their data and reported that the experimental group improved by ten percentile points and the control group improved by two percentile points. This effect size was found in both the fourth- and seventh-grade levels.

Roberts and Roberts (2008) examined metacognitive strategies using an inquiry approach. They further refined their research using specific criteria to identify the top 10% of incoming freshmen. Their rationale in participant selection was related to strong students and the level of reading comprehension they attained. They believed that if strong students were not reading with good comprehension, it could be because their skills and strategies were weak. They used a qualitative data collection approach in which they surveyed and interviewed proficient students. The participants consisted of 40 incoming freshman at the top of their class from a Midwest college. Findings indicated that students who actively processed the text did “something” with the material while reading. What they observed was that active processing of text enticed reader to read more. More importantly, it helped students develop reading comprehension strategies. As they revisited the theory of deep reading, a significant theme came to the forefront of their research: reading comprehension was enhanced as students acquired new reading comprehension strategies.

The work of Roberts and Roberts (2008) was important to this research for two reasons: (a) the researcher engaged in purposeful selection of high achieving students as participants in this research, and (b) identification of comprehension strategies used on the e-reader could help struggling readers become readers who are more proficient.

Researchers have also shown that proficient readers actively construct meaning in a print environment using a small set of powerful reading comprehension strategies (Pressley & Afflerbach, 1995). Duke and Pearson (2002) identified these skills as viewing text, setting goals, asking questions, and interpretation of text. Engaging students in elaborate questioning improves comprehension of text during instruction, and teaching students to self-question while reading also enhances student understanding of text and increases their comprehension (National Reading Panel, 2000). Therefore, retrospective think alouds can be supported through the research developed by Duke and Pearson (2002) as well as Pressley and Afflerbach, (1995).

Through a qualitative research approach, Pressley et al. (1998) investigated instructional practice regarding reading, writing, motivation, and instructional goals for 10 fourth- and fifth-grade classrooms. Using teacher interviews and monthly observations, they conducted a yearlong study in which they found that although classroom teachers in the study believed they taught strategies, there was little direct instruction with teachers mentioning comprehension strategies passively and minimally to their students. Findings showed that proficient readers used one or more metacognitive strategies to comprehend text. These strategies are developed over time, and readers learn which strategy to use and which strategy are the best suited to aid in the comprehension process. Pressley et al. (1998) cautioned that student comprehension was not enhanced just because the reader reads more or completes repeated readings. Comprehension is the active, intentional process of using effective strategies to enhance the reading process. This research has shown that reading comprehension can be

increased using strategies such as summarizing, predicated, and questioning applied before, during and after reading.

Additional research by Pressley (2000) reinforced the need for teachers to continue to teach and model strategies as well as provide time for students to practice. Furthermore, Pressley advocated for repetition of comprehension strategies, stating strategy acquisition takes time, and time was needed for the reader to become proficient and the strategy to become automatic. Pressley stated experimental validation of comprehension strategies instruction was needed to identify the impact reading instruction would have on reading achievement.

These two studies (Pressley, 2000; Pressley et al., 1998) were particularly relevant to the foundation of this research, as strategies used in an e-reading environment were unknown at the time of the study. Researchers have found that print-based strategies transfer to Internet reading; some strategies are different in digital reading; and some need to be modified for successful reading. What is currently unknown is if those same findings will transfer to e-reading educational environments. Therefore, these studies can be instrumental in supporting digital reading comprehension strategy identification and development.

With an increased focus on multiple strategies, Dewitz and Dewitz (2003) developed a case study using 10 fourth and fifth graders who displayed a high level (94% accuracy) of reading ability on grade level. Using a qualitative approach, the researchers assessed the current reading comprehension levels of the 10 students' using the *Quantitative Reading Inventory*, 3rd edition (QRI-3). They explored the individual

strengths and needs of each participant as they read three different passages from the QRI-3. Close analysis of student comprehension was captured through student reasoning of strategy use, and student errors were found to be directly related to students' failure to make connections with prior knowledge, inference, and syntax. Dewitz and Dewitz claimed that knowing when to use a particular strategy might increase reading comprehension. The tools used to assist the 10 students in the case study were derived from several instructional approaches to reading comprehension. Pressley (1992) identified the instructional approach as comprehension strategy instruction, and Palincsar and Brown (1984) identified the instructional approach as reciprocal teaching. Dewitz and Dewitz identified strategic knowledge of area of concern verbalized through reasoning [retrospective think alouds]. They believed that identification of area of concern might assist in individualizing the needs of readers. These findings can be used to support the need for retrospective think alouds to strategically verbalize reasoning of strategy use to navigate and negotiate reading on an e-reader for academic purposes.

In a descriptive study, Hock, Deshler, Marquis, and Brasseur, (2005) sought to identify reading strategies of 346 adolescent readers. The study included 83% of students who attended an urban school. The researchers' goal was to develop a profile of reading strategies mastered and not mastered. Students participating in the study were given a battery of assessments to determine rate, fluency, comprehension, word strategy skills, sight word recognition, phonemic awareness, vocabulary, and comprehension skills, and strategies. Results indicated that adolescent readers who were at or below the 40th percentile needed intensive word level interventions. This was in contrast to proficient

readers who had already acquired both vocabulary acquisition and comprehension needed for a higher level of comprehension instruction.

In the field of research education, Edmonds et al. (2009) conducted a meta-analysis of literature related to reading interventions and the effect on reading comprehension. What was revealed was that most students demonstrated improved reading when strategies were taught. The researchers also found that successful readers monitor their comprehension while they are reading. They self-monitor, self-question, predict, summarize, clarify, and develop questions to facilitate comprehension. These strategies enable the reader to make connections and signal when comprehension and meaning breaks down, thereby guiding the reader to implement corrective strategies. Edmonds et al. (2009) found that when students were taught to use reading comprehension strategies before, during, and after reading, they became strategic readers. The researchers also indicated that meaning breaks down for poor readers who are less strategic. The reports, however, have all been in the print text domain. What was unknown at the time of the present study was what strategies students need to facilitate reading comprehension on an electronic device. Thus, the research supporting print-based reading strategies will be used to begin to build a foundation.

Good teachers have been using good literature for years to inspire comprehension understanding (Fisher, Lapp, & Wood, 2011). Several of the studies have stressed the importance of comprehension strategies that are strategically taught through direct, explicit instruction using think alouds, which can increase students' use of these strategies and thereby increase reading comprehension for struggling readers.

Metacognition and Nonfiction Text

Challenges associated with expository text exceeded those associated with the five pillars of reading instruction (phonemic awareness, phonics, vocabulary, fluency, and comprehension (NRP, 2000). Fang (2008) compared reading strategies needed for a narrative text with strategies needed for expository text. He illustrated the complexities of nonfiction text and posited that three additional pillars were necessary to orchestrate the process of understanding nonfiction text: (a) understanding language, (b) possessing background knowledge and (c) having a repertoire of self-regulated strategies. Analysis of current research indicated that students encountered unique comprehension challenges, and additional strategies were needed to develop insight into the nature and character of expository material and specifically language associated with nonfiction content.

Having determined that few studies had been focused on think alouds with nonfiction text, Kucan (1993) investigated sixth-grade students' use of reading strategies to facilitate comprehension as they read nonfiction text using think alouds. The research focused on cognitive processes in reading in which they investigated the performance of 3 sixth-grade middle school boys to determine what readers think aloud as they read nonfiction text. An excerpt was used which consisted of 456 words, 25 sentences, and seven paragraphs with an eighth-grade text readability. Students were asked to read aloud until they arrived at a predetermined mark indicated by an orange dot. At that point, they were to think aloud. The excerpts were usually between two and four sentences in length. Protocols were transcribed using a coding system and segmented into interactions. The data revealed that the readers had dominance in strategy, i.e.,

elaboration, reasoning, and signaling for understanding. Further analysis of the data showed that students in this study provided little evidence of the use of signaling for understanding. As the students read nonfiction text, they failed to paraphrase, summarize three or more sentences, or develop statements of understanding. The findings indicated that students constantly used either elaboration or reasoning. Kucan and Beck continued their research in 1997 using nonfiction text with fourth-grade students. They analyzed the think aloud protocols to investigate and describe what readers were doing as they read nonfiction text. They found that three of four students, in reading five different expository text selections and five different narrative selections, were affected by the genre.

Predictive strategies for nonfiction text were the focus of research for Afflerbach (1990). Afflerbach examined genre and the information of prior knowledge as two variables and found that familiarity with content influenced readers' frequency of predictive strategies as they negotiated nonfiction text. It was also found that students made more predictions with familiar stories. Further analysis of the data revealed that genre played an important role in predicting the interaction with text. Afflerbach further stated knowledge of content as well as organization of text-affected students' ability to make predictions.

In a comparative study of 7 fifth graders, Afflerbach and VanSledright (2002) investigated strategies used as the students read text chapters related to history. Students read in an innovative history book and in a traditional history text. The researchers utilized a think aloud methodology where students provided think alouds as they engaged

with the text. After analyzing the data, it was determined that students responded differently to the traditional text, using different strategies based on the challenges of the text. These findings showed that students applied specific strategies based on specific purposes related to text and text features.

Language related to content and nonfiction possesses specific challenges related to content vocabulary and prior knowledge, adding to the density of the text and the information presented (Halliday & Hassan, 1985). In their view, nonfiction text creates additional complexities for students who may already be struggling. Nonfiction text structure has specific challenges: complexity of content, specialized vocabulary and text structure because the reader needs to monitor, question, and make inferences related to prior knowledge. Knowledge of text structure can influence the reader's choice of strategies to facilitate meaning.

In the report of the RAND (2002) study group, it was observed that in order for students to use nonfiction text effectively they must receive direct and explicit instruction on how to extract information from text. This need is magnified as students begin to extract informational text through hypertext links embedded in their digital text during the reading process. The need is even greater as students extract information from the text and the hyperlink, sometimes simultaneously, while reading for meaning. The RAND group concluded that eighth-grade students who are nonwhite or from low-income families read three to four grade levels below students who are white and come from a higher economic status (Office of Vocation and Adult Education, 2002). What researchers have also determined is that text complexity increased due to the percentage

of reading that is expository beyond fourth grade. These additional challenges are compounded as students are being introduced to e-readers. Research related to nonfiction is important to this study because students will be encountering nonfiction text and digital literacies simultaneously, adding an additional layer to the process of reading comprehension.

Reading Comprehension Using the Internet

The dearth of research on comprehension strategies for use with digital text requires a digital concept of literacy. Despite the increased use of digital text, little is known about the patterns of reading and the cognitive processes readers use in a nonlinear digital text format (Coiro, 2003a; Kamil et al., 2000; Leu et al, forthcoming; Balcytiene, 1999). However, a body of research is emerging on this subject based on the specialized needs of adolescent readers. Questions abound as to whether the same strategies used in print reading will support comprehension on an e-reader, what those strategies will be, and how teachers will identify them. Researchers (Coiro, 2011; Hartman, 1991; Leu et al., 2004) have begun to shed light on teaching methods related to digital text comprehension and the transference of research-based strategies.

Internet and Dual Literacies

Coiro and Kennedy (2011) used the work identified by Hartman et al. (2010) to situate new literacies and the findings, which resulted from the three-year Teaching Internet Comprehension to Adolescents (TICA) study. They suggested that print

assessment does not capture the complexities of the comprehension process displayed online. Coiro and Kennedy explained the Online Reading Comprehension Assessment (ORCA), which has been used to capture real time online reading and has used a variety of formats to estimate the online reading comprehension abilities of over 1,000 seventh graders. The ORCA experience presents readers with unique inquiry questions in a Facebook format. Students have 45 minutes to search, synthesize, and evaluate the questions. The ORCA data scenario progression captured through excerpts of video can assist teachers in identifying instructional strategies that might prepare students for the rigor of Common Core Standards established as part of the ORCA assessment. Six of the 32 anchor standards specifically link to digital literacies in both reading and writing. ORCA's underlying design is framed within the dual literacies of New Literacies and focuses on the lower case new literacies to frame online reading comprehension as a reading inquiry in which problem solving involves the following strategies when reading online text: locating, critically evaluating, synthesizing, and communicating information.

Preliminary testing of the ORCA scenarios using over 1,000 seventh graders in language arts and science demonstrated adequate validity and reliability. Although Coiro and Kennedy (2011) examined assessment of New Literacies, it is important to the study because of the dual level of new literacies and the framework of strategies used to problem solve online. It is also important because of the anchor standards specifically linked to digital literacies that have been identified by Coiro and Kennedy through this evaluative research. It may also be instrumental in the use of video experts to assist in

identifying strategies students are using to read nonfiction text on the iPad for instructional purposes.

Azevedo (2005) posited that empirical research was needed which focused on hypermedia learning environments aimed at scaffolding learning. Azevedo theorized that empirical research is needed to understand what type of scaffolding would be effective. According to Azevedo and Jacobson (2008), hypermedia learning environments allow the learner to access and manipulate multiple representations of information while receiving little or no scaffolding during learning. These authors have stated that computer based learning environments can adapt to the needs of the individual learner, thus providing scaffolding. Scaffolding or support tools can be used during the learning process to support complex text. Azevedo and Jacobson illustrated how recent theoretical and research perspectives from learning science and educational technologies are needed to construct a foundation for effective hypertext and hypermedia systems for academic learning. Shapiro (2000) further supported this notion by stating embedded scaffolding is needed to support learning of conceptual topics using different types of scaffolding.

Parmer (2011) looked at instructional technology and its effectiveness in improving students' reading performance using a large sample size of 961 students in Grades 2-5 from three different schools. The study was conducted to determine exposure or access to a specific reading program called Success Maker®. The researcher refined the participant selection using purposive sampling and determined mean significant difference of reading and fluency scores of students who had access to Success Maker ®. Results showed students who used the program consistently for 30-60 minutes per week

made 1.6 months of comprehension gain in one month for at least seven months of data collection. Fluency rates increased by 20 words per minute, and 40% of the students who used the program doubled their rate of fluency. Parmer used an instructional technology approach in his research. This was relevant to this research as classroom teachers use iPads for individual and whole class instruction and reading.

Zang and Duke (2008) explored how reading strategy use changed due to purpose set by the reader. Using a qualitative approach, the researchers sought to explore how readers used various strategies based on purpose: entertainment, locating, and information. Using a purposeful sampling of experienced Internet users, the researchers identified strategies used and transferred for different reading purposes. The theoretical perspective relied upon cognitive theory, flexible theory, and New Literacy theory, and the researchers used a triangulation of data using observation, navigational records, and stimulated recall responses. Findings indicated that more than 50 strategies were applied throughout all three reading purposes. The results of the study indicated that reading on the Internet was an active process in which some of the same print strategies transfer to web-based reading. Though this study lacked frequency of use for the given strategies, it was important because of two observations relative to the findings: the need to be aware of and state frequency of use, and the importance of triangulation of data to support findings.

Castek (2008) used a mixed method approach to examine classroom learning and scaffolding conditions-learning outcomes to compare reading comprehension strategies for fourth and fifth graders. Using the theoretical framework of New Literacies,

scaffolding theory and inquiry perspective, Castek sought to examine classroom learning through scaffolding of reading comprehension strategies used on the Internet. Castek explored how 30 fourth- and fifth-grade students acquired new literacies of online reading. Castek used a triangulation of data sources beginning with observation field notes, student interviews, real time screen capture, artifacts, teacher interview, teacher reflection, and classroom observations. Her findings indicated that student gains were statistically significant. Results illustrated significant differences in online reading comprehension as well as greater gains in content knowledge. A t-test was used to determine differences as well as coding using a recursive, analytic inductive method. After 15 weeks of online reading comprehension instruction, Castek compared the results to those of the control group who did not have instruction. The themes that emerged indicated that students acquired online skills and strategies when instruction was provided. Further investigation of the findings showed higher order thinking skills were much higher for the experimental group. Castek has set the foundation for data collection and triangulation of data based on multiple points. The findings in Castek's study were relevant to this study because findings from the research could provide further support for the need for instructional strategies and scaffolding to increase learning outcomes as well as development of higher order thinking skills and strategies.

Coiro and Dobler (2007) used a qualitative study using think aloud protocols, observations, and post reading interviews to explore online reading strategies. Coiro and Dobler found that online reading shared a number of similarities with print-based text reading. They also found that online comprehension was more complex, and notable

differences existed when transferring print-based strategies to online text, indicating that they were not isomorphic. They found that although prior knowledge, inferential reading, and self-regulated reading processes had similarities, differences appeared in reading behaviors as the text became more recursive in the Internet environment. Although these themes had similarities to print text, use of corrective strategies differed. Corrective strategies became a series of isolated strategies. The 11 sixth graders who participated in this study displayed varying degrees of strategy use as they encountered multiple layers of websites and often skimmed or scanned for information. Four strategies emerged from Coiro and Dobler's work that are relevant to digital reading: (a) plan, (b) predict, (c) monitor, and (d) evaluate.

Coiro and Dobler (2007) also speculated that a self-regulated reading process was being implemented as readers negotiated and navigated text, and they referred to this as a dual metacognitive process of evaluation and regulation. They chose to conduct a qualitative in-depth analysis of a few research participants reading on the Internet rather than study a broader group. They believed a more focused study would provide richer details into a research topic that had received little attention from researchers. Utilizing a purposeful sample, they selected 11 students and explored their online reading strategy use to facilitate reading comprehension. Skilled readers were selected for study because of the likelihood of their having a wider range of appropriate strategies when completing a reading task (Pearson, Roehler, Dole, & Duffy, 1992). They posited that reading strategies intertwined with the physical reading actions, prior knowledge of informational website structure would lead to additional complexities for strategy use as well as a

multilayered reading process across three-dimensional Internet spaces. Verbal protocols, interviews, and field observations were used to gather data. Although this research by Coiro and Dobler (2007) is relatively current, the newness of New Literacies makes this foundational research and supports the need for further research relevant to digital literacies. This study was extremely valuable in evaluating think aloud protocols and digital reading strategy identification because it provided a model for other studies.

Castek (2006), a member of the New Literacies Research team, discussed the team's research efforts. The team modified and adapted Palincsar and Brown's (1984) instructional approach to Reciprocal Teaching (RT) to be more in line with the Internet. This modified version of an instructional approach has been referred to as Internet Reciprocal Teaching (IRT). The purpose was to identify new reading strategies for online reading comprehension. Using a scale, researchers rated the intensity of use by students and developed four levels of Internet integration. High intensity consisted of 24 students who received whole class instructional strategy use four to five times a week for the entire 12 weeks. The second level of intensity was the moderate level in which 21 students used the Internet without instruction for the first five weeks and then received the same instructional strategy, as did the high intensity level. The third level of Internet integration was low intensity in which 22 students used no computers for the first five weeks. They used text only: science texts, encyclopedias, library books, or other reference materials. After the initial five weeks, this low intensity group used the computer to examine online animation and interactive websites. They had no direct instruction of strategy use. The final level of intensity was the control group that

received no instruction and no use of the Internet. Using a one-way analysis of variance (ANOVA), the researchers found a significant difference in content knowledge between each of the groups and the control group. There was a decrease in science content knowledge for the three groups. The medium interactive group had the largest difference (62.89), and the low interactive group had the second largest difference (60.27). The high interactive group had a 59.80 mean difference. The researchers speculated that the differences could be attributed to the lack of knowledge and skills needed for online comprehension. They stated that students had to acquire the skills needed to enhance their learning before acquiring the content material. The final phase of this study used video to capture some of the strategies of both the lowest and highest performing students as indicated on state reading assessments. Results supported the notion that struggling readers can benefit from online reading strategies. Further evaluation of this study in relationship to my research shows the need for instructional support and scaffolding of strategy teaching. This study may help to support additional findings after completion of my research.

Teaching Internet Comprehension to Adolescents (TICA 2005-2008) was a collaborative effort between Reinking of Clemson University, the New Literacies Team, and a team of graduate students from the University of Connecticut. The study was funded by a three-year grant from the Institute of Education Services. The goals for the three-year project were to develop a data driven theoretical framework and identify variables in the first year that would guide future research efforts. In the second and third years, the work of researchers was focused on the variables identified in the first year.

Because of this foundational research, Internet Reciprocal Teaching (IRT) was established as an instructional tool to facilitate online reading comprehension strategies. The team identified its population from areas neighboring the two universities and selected both rural and urban students with low support for success for their pool of participants. Their pedagogical goal was to identify reading comprehension strategies that would improve reading (online-offline). It was also the intent of the TICA research to increase academic engagement for the students most at risk of dropping out. Using the theoretical framework of content area learning and new literacies, the New Literacies team sought to discover if the Internet was an effective instructional tool to produce high scores on measures of science concept knowledge (Castek, Leu, Coiro, Hartman, & Henry, 2006). An intervention framework was used to investigate reading comprehension skills and strategies required to learn science content in an online environment. For 12 weeks, the Internet was integrated into three science classes. The results were compared to those of a control group to determine what varying levels of interactions and strategies students used as they read for meaning on the Internet. This study showed the need for an intervention framework to investigate reading comprehension strategies. The development of research is ongoing and complex as noted in this multiyear study and the progression of elements identified throughout the study. This study was important to the present study as the identification of additional variables could extend the findings of Castek et al. (2006) and lead to further research in this developing area.

The following studies (Anderson, 2003; Behalova, 2010; Sheorey & Mokhtari, 2001; Kymes, 2007) were all important to the present study because of their measurement of perceived strategy use by students using the MARSI, M-MARSI, and OSORS. The researchers also used surveys to measure students' perceived use of print (MARSI) and digital text (M-MARSI or OSORS). The surveys were used in each study as a tool for purposeful selection of participants. In this study, the survey tool was used as an indicator for purposeful participant selection.

Anderson (2003) researched online reading strategies in a second language/foreign language to explore what online reading strategies second language readers use. Anderson examined the differences in reading strategy use between native and non-native speakers of English. Using a quantitative methodology, Anderson modified Metacognitive Awareness of Reading Strategies Inventory (MARSI) (Mokhtari & Reichard, 2002). The modified online version, Online Survey of Reading Strategies (OSORS), was adapted to measure metacognitive reading strategies. Findings using the modified survey revealed a variety of reading strategies were reported on the OSORS and many similarities between readers in the two environments (print and online). The only significant difference indicated between the two groups was that English speakers reported higher use of problem solving strategies than non-English speakers.

Behalova (2010) explored online reading strategies of undergraduate students determine the transference of strategies form print based reading to web based reading. The purpose of this study was to explore the actual and perceived online reading strategies used by selected students using a case study approach. A total of 391

inventories were distributed using both the Metacognitive Awareness of Reading Strategies Inventory (MARSI) (Mokhtari & Reichard, 2002) and modified version of the MARSI called M-MARSI. Of the 386 respondents, six individuals with high-perceived strategy use were selected to participate in the case study. Findings from this study indicated similarities between web based and print based reading strategies. Using verbal protocols, the researcher documented 29 print-based strategies that transferred to an online environment.

Sheorey and Mokhtari (2001), using the framework identified by Flavell (1976) for strategic reading and metacognitive knowledge of skilled readers, sought to identify the differences between native readers and non-native readers using both the Metacognitive Awareness of Reading Strategies Inventory (MARSI) (Mokhtari & Reichard, 2002) and the Survey of Reading Strategies (SORS). Participants in the study consisted of 302 college students, 152 non-native English speakers, and 150 native English speakers. In this mixed method study, the researchers used descriptive analysis as well as a t-test and ANOVAs to examine whether significant differences existed between the two groups of students. Results showed both groups had preferences for cognitive strategies followed by metacognitive strategies, and support strategies. The differences between the groups were statistically significant only in the use of support strategies where the non-native group used support strategies more frequently than did the native English speakers.

Kymes (2007) used a mixed method study to investigate and analyze online strategy use for adolescent readers. The purpose of this study was to analyze and

categorize strategies used by high school students while searching and reading for information using online text. The theoretical framework used involved think alouds, strategy construction and an integration model as well as metacognition. A total of 69 students from a large urban Midwestern state enrolled in a regional and career technology center were selected for participation. Additionally, 13 students were purposefully selected for think aloud data collection used in Phase I. Kymes used the (MARSI) as well as a modified version on Online Survey of Reading Strategies (OSORS). Data collection relied on multiple data for triangulation and included the previously mentioned surveys as well as observations and reading levels. Think alouds were videotaped to capture students' thoughts as they interacted with the online informational text. Kymes coded the data and categorized the strategies to report the findings. All participants reported using more strategies more often when reading online compared to reading offline. Think aloud data revealed students were active strategy users online, and many strategies were similar to offline print strategies. Data further indicated that different strategies were exhibited while reading online, e.g., tracking with the cursor, making connections to other media text, and searching for items on the Internet related to what participants were reading.

The London Group (1996) coined the term, multiliteracies, based on the theoretical overviews of the connection between the ever-changing social environment and the new approach to literacy pedagogy. Pedagogy has been viewed as pertaining to activities that impart knowledge or skill to the learner or more specifically, "the teaching and learning relationship that creates the potential for building learning conditions

leading to full and equitable social participation” (The London Group, 1996, p. 60). The London Group has added another layer to the understanding of pedagogy. Literacy pedagogy has been defined as moving from a traditional means of teaching and learning confined to a page-bound media into a restructured understanding of content and control of multimedia technologies or multiliteracies.

In conclusion, well developed, multifaceted and various views are needed to understand the density of digital text reading comprehension. Castek et al. (2010) proposed a theoretical definition for digital literacies “. . . which includes skills, strategies and dispositions necessary to successfully adapt to the ever-changing information and communication technologies. These digital strategies allow the reader to identify important questions, locate information, analyze, and synthesize so they can communicate to others” (p. 11).

What has been learned from the current research is that digital readers physically construct the text they read based on the choices they make (Coiro & Dobler, 2007). Thus, with each keystroke, readers create a digital page, a chapter, or a book in which they are actively engaged in questioning, locating, evaluating, synthesizing, and creating understanding (Coiro & Dobler, 2007). With each hyperlink, readers are dynamically constructing a virtual text that they read as they move through a problem or question. Herein, the comprehension processes become more complex and translucent, because the text is in the reader’s mind. Access of information via Internet requires multiple layers of comprehension and application of additional critical thinking skills to analyze data that are constantly changing and evolving. The additional features of an e-reading device

play a critical role in the complexity of metacognition. Because each device has features specific to the device itself, prior knowledge of the device may affect the level of comprehension.

Policymakers are still mired in looking at literacy from a print perspective, requiring all schools to achieve literacy proficiency. As Leu (2000) observed, literacy is defined by change, and its meaning is dependent on quickly changing technology for information and communication. For the first time in history, according to Leu (2000), “We are unable to accurately anticipate the recurrent expectations at the time of graduation for children who are currently entering school” (p. 760).

Reading Comprehension Using e-Readers

Electronic books have become very popular as educational tools in the United States (Becker, 2010). Many schools have used fees allocated to technology and textbooks to adopt some type of e-reader. The RAND Study Group (2002) commented on the reading complexity that electronic text incorporating hyperlinks introduces, because additional skills and strategies are required beyond the requirements for conventional linear print. These complexities are illustrated in several of the studies in this literature review.

Meeting the requirements for the new teacher evaluation and the high accountability associated with this new evaluation has left little room for innovation in most classrooms. Many teachers have abandoned the effort to experiment with technology in their classrooms, and federal budget cuts have hampered the

implementation of state-of-the-art technology in many districts. Becker (2000) developed a nationwide survey to examine the relationship between socioeconomic status (SES) and teaching practices related to technology. What he found was that most teachers in high SES schools presented information and analyzed the findings, whereas teachers in low SES schools used technology for reinforcement and remediation. In order to develop 21st century skills, students must be actively engaged with digital content, analytic tools, and multimedia forms of communication. They must have authentic, complex, collaborative tools needed for communication in the 21st century work force (Roschelle, Pea, Hoadly, Gordin, & Means, 2000). Schools must give students the opportunity to use relevant technologies with frequency and depth. Labbo and Reinking (1999) stated that before the depth of literacy issues can be understood, policy makers, teachers, and researchers must recognize how digital literacies are evolving and developing in the educational environment. The following studies look at reading comprehension through the lens of new literacy.

E-readers and New Literacies

In a mixed method study using the iPad, Dale (2011) collected data from two groups of sixth-grade students. Both groups read the same text, the experimental group reading on iPads. The researcher wanted to determine the extent to which features of an electronic book would make a difference in student engagement and if the experience would improve their understanding of text. They also wanted to determine if significant changes occurred in the way students processed content with a reading device. No

significant differences were displayed between the groups. The findings did indicate several distractions that may have affected the results. First, the iPad, itself, was at times a distraction. The fact that students could modify the settings became a distraction as students were sharing the device and every time a student returned to the device, the changes were specific to the previous reader. This caused students to stop and adjust settings and features to personalize them for themselves. Second, annotation on the device posed some challenges, and the classroom teacher often modified the development of the annotation on the sticky notes. For example, the classroom teacher assigned a specific color to the sticky note based on purpose. Changes to text font and size caused additional problems; each time the text size changed so did the page numbers. These were noted as affecting comprehension, as it was difficult to reread or refer to specific pages for reference. Wireless connections also caused major issues, as the infrastructure in the school was not powerful enough to connect the entire class at the same time. One of the more important findings, which had nothing to do with the research question, was the choice of text. The researcher found this to be very problematic, as many appropriate texts were not available as e-Books. The researchers chose to use a book from the Gutenberg Project that was supported as an ePub format. Additional topics arose outside of the elements of the study that dealt with classroom management and organization of devices including synchronizing content and charging devices.

Larson (2007) developed a qualitative case study to examine how 10 fifth-grade students used e-books. The case study was used to support the integration of technology through the emergence of new literacies within the context of an electronic reading

workshop in a fifth-grade classroom. Using the theoretical framework of New Literacies, constructivism specifically cognitive and socio-cultural, and transactional theory, Larson sought to explore New Literacies through the instructional support of technology. Triangulation of data collection involved three months of observation and field notes, digital video recordings, student interviews, digital photography, video clips, documents, and artifacts related to lessons. Analyses of the findings were presented through descriptive writing samples. Further analysis of e-journals revealed the following categories that emerged because of this study: personal meaning making, character and plot involvement, and literary criticism. The study shed light on the possibility for integration of technology and literacy within the context of an electronic reader's workshop. Findings indicated that technology integration supported the emergence of new literacies. Larson's use of an electronic reading workshop for instructional technologies supported the need for a strong instructional foundation for iPad use and e-readers implemented in the classroom. Larson's findings showed the need for instructional technologies that support the dual level of new literacies in the classroom.

Hutchison et al. (2012) used a qualitative approach to collect data to support an exploratory case study with approximately 23 fourth-grade students over a three-week period as they used the iPad in an academic environment for reading. They held focus groups, interviews, and gathered data through observations to investigate the integration of print-based literacy goals and literacy skills needed for the 21st century. This study used the Technological Pedagogical Content Knowledge (TPACK) framework as a lens for understanding the viability of integrating iPads into literacy instruction. The TPACK

framework includes knowledge of technology and how this knowledge is used to facilitate and support learning. This can, of course, contribute to knowing how teaching might change because of technology (Mishra & Koehler, 2006). Analysis of the data revealed that many of the students in this study expressed a strong desire to interact with the device for reading and enjoyed exploring the device. Their findings displayed a strong need for procedure implementation, as many students simply browsed the e-books or skimmed, selecting multiple books on the e-book shelf in a short period. Though cautioning that overall text selection was very limited in iBooks, researchers noted that students often selected books that were too easy for them to read because they had the entire selection of e-books available to them on the vertical e-book shelf. Findings from this study were instrumental to this study to support student learning of skills related to the 21st century as well as the integration of print based literacy skills.

Brown (2012) conducted a study to determine whether reading electronic books with E-readers would increase adolescent readers' engagement with text and would motivate them to read further. Using a large urban population and a large sample size, Brown selected sixth through eighth-grade reluctant readers. The participants read for 15-20 minutes daily on the electronic device. Preliminary results indicated that after two months of reading electronic text on e-readers, students displayed more engagement with the text and they felt the device motivated them to read. Further analysis of the data suggested that boys valued the device more than did girls.

Schugar, Schugar, and Penny (2011) conducted an exploratory study with college students to discover how students use e-readers (the Nook) for academic reading.

Though this research was conducted with college students, the students were only one year distant from the high school population. Schugar et al. (2011) wanted to investigate differences in reading comprehension when reading from e-readers and traditional text. The exploratory study used pre- and post-surveys to determine familiarity with e-readers. The second form of data used was a quick write to evaluate written responses of 30 first-year-in-college students in a general education course. The writing samples were evaluated using the Question Answer Response (QAR) (Raphael, 1982) framework. The writing was quantified using a t-test and repeated measures ANOVA. Analysis of the data showed the Nook group had a higher level of comprehension on the first quick write. Yet, analysis of the remaining quick writes (2, 3, and 4) showed no significant differences. In the post-survey, students were asked to reflect on their strategy use on the Nook. Nook readers reported being strategic readers when reading traditional print. This did not, however, transfer to the e-reader.

Schugar et al. (2011) discussed enormous possibilities and probabilities for the e-reader but cautioned that the resources were still developing. Schugar et al. stated that research was lacking in the area of new literacy skills students need as they engage with e-reading devices, specifically research related to learning with the device. Active reading varies from traditional print, as readers cannot mark or write directly on the paper. Although e-readers allow the readers to annotate using apps like iAnnotate or Goodreader, managing these skills requires different literacy strategies.

What has been noted so far in the research is that additional tasks such as note taking, previewing, reviewing, and skimming are approached differently. As discussed

by Afflerbach and Cho (2008), there is a need for teachers to better incorporate these devices into their classroom pedagogy. On the surface, they are very easy to simply access and use, but pedagogical frameworks must be in place so these electronic reading tools become part of educational experiences and teaching methodology (Pierce, 2011). Given the limited research available on e-readers, including this report in the literature review was warranted and relevant to this research.

Nielson (2010) developed a within-subject study in which 24 adults read literature in several formats--print, Kindle, iPad, personal computer. Nielson's findings indicated that fluency rates varied based on device, and print was faster than any of the other formats. iPad was 6.2% slower than print, and the Kindle was 10.7% slower than print. Again, very little research has been focused in this area of exploration. The direct impact was unknown at the time of the present study.

Pierce (2011) reported on findings from a teacher research project using 24 iPads in the classroom to support academic learning. A teacher in a Euclid, Ohio school set out to explore the impact of literacy on student achievement while reading on an iPad. The school was comprised of a high population of free or reduced lunch students and a majority of students who were African American. Students used the iPad to journal in Moodlet; they took formative assessments on the device and developed acquisition of vocabulary using Wordflick. It was noted in the research report that the simplicity and familiarity of the iPad created excitement for learning. Using a control group and an experimental group, the data were compared using one group of sophomores using the iPad to that of students without an iPad. The researchers indicated that students who used

the iPad had a 6% greater chance of passing the reading portion of the Ohio Graduation Examination and an 8% greater chance of passing the writing portion of the Ohio Graduation Examination.

Pierce (2011) reported on a study conducted in the upper Midwest that was focused on 31 students from two fourth-grade classes who read up to six literature books, alternating between a Kindle e-reader and traditional print. After reading a book, the students were instructed to take an accelerated reading assessment to measure their comprehension of the story. In this exploratory research, the results showed no significant difference between students who read on the Kindle compared to students who read using traditional print text. The Kindle readers averaged 88%, and print readers averaged 88.5%. The mean difference was only 0.5%, showing no significant difference in reading between print and the device. The above-mentioned studies are important to the new literacies and this research because of the early findings in a field with little research.

The recent influx of iPads in the classroom has sparked interest in teachers as researchers. Price (2011), a teacher researcher, obtained a grant to fund the purchase of 10 iPads in the summer of 2010 to be used with Autistic students to increase and overcome informational access barriers. Price conducted her research with a small study group of 10 middle school, 10 high school, and 10 students 18 years of age or older, all with varying ranges of Autism. All students read interactive text supported by audio and full color pictures. Findings indicated that all students made learning gains as follows: middle school, 21%; high school, 25%; and students 18 years of age and over, 21%. All

three groups also showed significant improvement in regard to information acquisition while using the iPad for reading. The most problematic area was book selection. Dale (2011) also noted some of the same concerns in his mixed method study using the iPad for reading. Price (2011) voiced her concern for the lack of a database with search specifications, i.e., genre, topics, age, and level of book. In addition, because this study used full audio to support reading, the voiceover feature became extremely problematic. Once it was activated, touching an app simply read the app, and additional movements were required to open the app. The researcher eliminated this element from her study because of the issues related to it and the frustration the students encountered as they tried to negotiate the text and navigate on the iPad. The studies of Price and Dale were important to this study because of several areas of cautions found in the two studies including book selection and features that supported or impeded reading comprehension on the device. It is important to note the issues developed through early research studies as they can help facilitate less troubled research studies in the future.

Examining the impact of student's perception and the iPad Yuan, Chae, & Natriello (2011) developed a pilot study to investigate high school students' perception of an iPad e-reader for academic purposes. The study used a convenience sample, which included one 10th grader, three 11th graders, and five 12th graders from different schools in the New York City area. Using Theory Diffusion of Innovation (Rogers, 1976), the researcher developed an open-ended questionnaire and conducted focus groups to examine students' reading experiences on the iPad. None of the students had experience with the iPad prior to this pilot study. Two iPads were provided and students took turns

reading literature on them for two hours. During that time, the students could explore any of the device's features and functions as well as reading the literature text.

Investigators used open-ended questions and focus groups for debriefing. A blog was also used to capture comments posted by students about the study. In the focus groups, the students discussed their preconceived perceptions of digital use at their high schools. Because their high schools had restrictions on device use in the schools, students believed that this device would not be allowed, and schools might confiscate an e-reader. Students viewed using this device as breaking the rules. It was also revealed that students enjoyed ownership and personalization of the device as they were reading. They also enjoyed the research ability while reading. They commented on the menu that offered links to dictionary, search engines, highlighting, the ability to add notes, and searching the entire book for a word or phrase. In addition to searching the book, they valued the quick links provided within the text that linked them to Google or Wikipedia. Students also mentioned in their focus groups that they were not satisfied with the writing features of the device (sticky notes), stating that they would like more flexible space for taking notes while reading. This study was relevant to the exploration of perceived use of features on the device for academic support in the present study.

Readers must begin to construct meaning in a divergent path that calls for fluid movement and ultimately requires readers to critically evaluate the results of their reading. Students must monitor and adjust their processing of information based on textual format (Kamil, Mosenthal, Pearson, & Barr, 2000). Technology or use of digital text resources does not simply increase comprehension (Kramarski & Feldman, 2000).

The complexity of New Literacies has, however, created a roadblock for reading, and the fluid nature of online reading has caused readers to become easily distracted. The hyperlinks they choose, the search engines they use, and the manner in which they read screens affect readers' abilities to understand what they are reading. Students are creating the text virtually in their heads with each keystroke on an iPad. Reading is no longer a linear process; it is a recursive process constructed by students with each movement they make within the device (Coiro, 2005). This process sometimes requires readers to pause to reread a page, a paragraph, or a sentence to capture the author's thoughts (Wolf & Barzillai, 2009). The research findings revealed that effective instruction in reading comprehension strategies was needed as New Literacies have placed additional demands on the individual reader. What was unclear were the specifics related to reading comprehension strategies needed by readers as they navigated and negotiated reading on an e-reader for educational purposes.

Summary

The complexity of New Literacies shows a strong need for a qualitative approach to research methodology with a dyadic approach to the development of research. Due to the limited research that has been conducted and the dynamics of online learning, there is a continued need for observation and anecdotal records for measurement. Until a tool is developed, tested, and validated for online comprehension measurement, observation is the strongest means of measurement.

As many methods emerge in the development of new literacies, researchers will begin to define the components associated within this new domain. They have all agreed that new literacies are redefining what it will mean to be literate in the 21st century.

This chapter has presented a review of the literature and research related to the exploration of adolescent reader use of metacognitive strategies for comprehension of nonfiction text using an e-reader. The remainder of the chapter was devoted to three major topics: (a) reading comprehension, (b) reading comprehension using the Internet, and (c) reading comprehension using e-readers.

CHAPTER 3 METHODOLOGY

Introduction

In this chapter, the methodological approach and data collection procedures relevant to this study are detailed. These procedures were chosen as a result of the design of the study and the primary question to be answered. This study explored strategies used by eighth-grade readers as they read nonfiction text during their social studies unit using an iPad. In examining the use of strategies of eighth-grade readers in a social studies class, both descriptive and interpretative methods of a case study analysis was employed. A case study of eight selected students was used to illuminate strategies being used to facilitate reading comprehension on the e-reader. It also helped to conceptualize how students interact with the device to support New Literacies.

The chapter is organized to present the purpose of the study followed by a report of a pilot study conducted to refine various elements of the study. The research design is explained, and the rationale for the selection of participants is discussed. Instrumentation and other sources of data, including field notes and protocols, are detailed. Procedures related to data collection and analysis are also discussed.

Purpose of the Study

The purpose of this study was to investigate the experiences of eighth-grade students as they read nonfiction text on an iPad for academic purposes. Reading strategies used to support students' reading as well as what role the iPad features played

in the reading process were explored. The focus of this qualitative research was on understanding students' learning behaviors as they used emergent technologies for educational practice. It was the researcher's intent to capture what the students were actually doing as they interacted with the iPad to read and comprehend nonfiction text in an eighth-grade social studies classroom.

This research was conducted to investigate a phenomenological question, which used a qualitative descriptive research approach aimed at describing an experience as it is actually lived by an individual. Data sources for this study included the following: (a) retrospective think alouds; (b) student questionnaire about iPad knowledge and experiences; (c) pre-study student interview; (d) post-study student interview; (e) Metacognitive Awareness of Reading Strategies Inventory (MARSI); (f) student observations; (g) teacher interview; and (h) Lexile Levels which were used to support selection of eight identified students for the collective case study.

Pilot Study I

Instrumental in the development of this study was a pilot study conducted in the spring of 2012. This study allowed the researcher to gain insight and perspective into a relatively new concept: digital literacy. The pilot study focused on student comprehension and interaction with a specific device over a six-week period. Using a grounded theory framework, qualitative data were used to explore how students interacted with the device. The research in this pilot study showed a need for additional research related to comprehension and metacognition.

Pilot Study II

In a second pilot study, Zygouris-Coe, Cardullo, & Wilson explored fifth-grade students' interactions with e-readers and their use of reading comprehension strategies. Their exploratory research methodology was used to study a phenomenon through an inductive approach and to generate a deeper understanding of a topic that was not easily identified (Creswell, 2009). The researchers studied adolescent students' interactions with an e-reader (iPad and Kindle) as they read historical fiction on a dedicated e-reading device.

The purpose of this study was to investigate 28 fifth-grade students' (13 males and 15 females) reading comprehension while interacting with digital devices (iPad and Kindle) and traditional text. This study was conducted in a naturalistic setting in which students' participated in language arts and social studies content in their language arts block. This six-week study allowed students the opportunity to use one device for the duration of the study, having been randomly chosen by the classroom teacher to read on either an iPad or a Kindle. The researchers used qualitative analysis of electronic annotation of written summaries to identify themes. These analyses were used to determine the ways students wrote summaries on their e-readers. Observations were used to see how students interacted with the device as they read on e-readers.

This information was used to explore relationships that emerged from the data collection. Though it was not evident at first glance, the results showed consistency in summarization regardless of device. The format in which the notes were printed on both devices varied. The formatting of notepad on the Kindle hindered visualization of the

summaries for a multitude of reasons including (a) the format of the sticky notes on the Kindle caused the summaries to get lost in the string of text, and (b) print structure and sentence structure, which often had texting elements embedded in the text, hindered evaluation of summaries. Students often wrote without regard for sentence structure and semantics. The background of book as well as device played a critical role in the students' reading process. Students interacted differently with each device. Kindle students saw the device as an extension of texting. iPad students saw the device as an extension to learning strategies already in place (sticky notes and highlighting in print easily transferred to the iPad). Note taking varied within each device. After reviewing the pilot studies, it was evident that students' use of strategies was not easily observed. Thus, the researchers chose to add verbal protocols (retrospective think alouds) to strengthen this study.

Research Design

The intent of this collective case study was to investigate adolescent readers' use of reading comprehension strategies while reading, engaging and interacting with nonfiction text supported on the iPad. A design was chosen using qualitative data collection. Many of the research studies reviewed in the literature section have emphasized the importance of obtaining information by listening to students as they engage in the reading process. Thus, an exploratory study seemed most appropriate to investigate the interactions of readers as students read nonfiction text on the iPad for academic purposes.

A collective case study design uses narrative description to analyze data within each case and between cases, and this type of research was instrumental in analyzing the data. Yin (2003) stated that multiple data sources enhance the credibility of data. A collective case study allowed for analysis of performance at two levels: within each case and across the cases (Yin, 2003). The infancy of New Literacies and the multitude of theories led to the need for a collective case study approach to provide rich in-depth descriptions from multiple sources for collecting the data used to explore results more in depth (Tashakkori & Creswell, 2007). The main characteristic of a collective case study design is the investigation and collective presentation of several case narratives. Each case narrative is presented to portray its unique features and context. The collective presentation weaves the individual cases together to develop a snapshot of the whole. This is important because, according to Afflerbach & Cho (2009), descriptive based research is needed to describe the “intent and orchestration of reading strategies” (p. 85).

The methodology used to capture data in this research study was verbal reporting generated through the instruction of think alouds. This design was selected because verbal reports and protocols have been encouraged for the exploration of new literacies (Afflerbach & Cho, 2009) as a strong reporting method and analysis. Afflerbach and Cho have indicated that verbal reports are a good source of data when describing constructive response of reading comprehension strategies.

Pressley and Afflerbach (1995) recognized the importance of understanding how students process text. Strategic readers spend a substantial portion of reading time planning how they will process text, looking at the overview of the reading, monitoring

and developing a plan. They are reflective and flexible as they negotiate the text for understanding. As demands of the text become apparent, they respond. Constructively responsive readers monitor their reading while paying close attention to the characteristics of the text. Pressley and Afflerbach (1995) stated that constructively responsive readers know when and where to use reading strategies to support reading of complex text. This process allowed them to take advantage of opportunities afforded by the text for comprehension (structure, headings, inserts, [hyperlinks]). Excellent readers are actively “constructing” as they are interacting and responding to the text while reading for a purpose (Pressley & Afflerbach, 1995, p. 83). Responding to reading represents varied experiences as students interact with demanding text. Observations captured how students responded to the text and how they anticipated meaning.

This methodology was well suited for the exploration of student strategy use as students interacted with literacy that involved multiple texts. Although the primary source of data collection was think alouds, the researcher also relied upon traditional methods of data collection to support and enhance the findings through triangulation of data.

Setting

The study took place in a newly formed STEM (Science, Technology, Engineering, and Mathematics) non-profit, charter school operating in a large school district in central Florida. The school housed 282 students in Kindergarten through Grade 8 with 67% of its students receiving free or reduced lunch. At the time of the

study, because of the “F” rating by the state, it had been designated a plus one school with extended hours for learning. The school was a tuition-free institution with an open admission policy. At the time of the study, the school was in its initial phase of implementation of technology resources.

This charter school is committed to providing a challenging educational experience through a rich and well-balanced curriculum that focuses on STEM and a technology-saturated environment. It is founded on the belief that all differences are to be respected and that those who do not interfere with the rights of others and the learning environment will be accommodated. The mission statement touts critical thinking, independent problem solving, and strong communication skills through a hands-on approach to learning.

To meet high standards of student achievement as defined by the Common Core State Standards (CCSS) and Next Generation Sunshine State Standards (NGSSS), the school focuses on instruction using technology-driven rigorous curriculum that is centered heavily on the following core academic subject areas: language arts, mathematics, science, history, and a specialization in science and technology. The school’s philosophy is that “An educated citizen in the 21st century must have the technological skills and understanding to participate and work productively in a multicultural, globally-oriented environment, including the skills required to use technology to its full potential in the new millennium” (Burns, 2010, p. 5).

Because the school opened in fall of 2011, school data were limited. Preliminary review of available data indicated that the school received an F rating based on test data

for the school year 2011-2012. Of the school's students enrolled in Grades 3-8, 98% participated in FCAT testing in spring of 2012. With the exception of Grade 6 students, all grades scored lower than the mean developmental scale score of both the county and the state of Florida. Sixth-grade students' scored two points higher than the state average and three points higher than the county average. Additionally, the scores in mathematics and science were lower than the state and the county as well. The mean average writing score for fourth- and eighth-grade students was 3.0, well below the state and county averages. In looking more closely at the seventh-grade FCAT reading scores, it is important to note that 11 students in the current eighth-grade class received a 1 or 2 last year on FCAT Reading, 10 students scored a 3, and one student scored a 5. Average reading scores for the school are displayed in Table 1 and reveal several areas of concern as well in the seventh and eighth grade classrooms.

Table 1

Average 2012 Reading Scores: Florida Comprehensive Assessment Test (FCAT)

Grade Level	Vocabulary	Reading Analysis	Literary Analysis: Fiction and Nonfiction	Informational Text/Research Process
Grades 3-8	63.8%	67.0%	69.3%	62.8%
7 th Grade	64.1%	66.6%	68.1%	60.6%
8 th Grade	61.4%	56.7%	52.7%	52.5%

Participants

Students

Of the 282 students enrolled in Grades K-8, 21 were enrolled in the eighth grade in fall 2012. Of these students, 7 were female (33.3%) and 14 were male (66.7%). Eighth-grade classroom demographics indicated a high economically disadvantaged group of students, 19 (90.5%) of which were on free or reduced lunch. In regard to ethnicity, 18 (87.5%) of the eighth graders were white, two (9.5%) were black, and one (4.8%) was Asian. There were three (14.3%) eighth graders with disabilities.

Prior to the start of the study, all participating students in the eighth grade class were given the opportunity to explore the device (iPad) and websites related to the study of Abraham Lincoln. Results from the previous pilot study indicated that students often struggled with the newness of the device and often had varying levels of device proficiency. Therefore, training was provided by the researcher to allow for adequate time for interaction with the device.

Of the 21 eighth-grade students, eight proficient readers who displayed confidence, competency, and control over text were identified through purposeful selection to participate in an in-depth analysis of strategy use through think alouds. The criteria used for participant selection included (a) reading skills using Lexile Levels, (b) MARS survey, and (c) iPad use survey to determine prior knowledge of iPad. The eight selected students were identified as "good readers" using the following criteria: (a) average to high Lexile Scores, (b) average levels with the iPad, and (c) average to high

MARSI levels. If prior knowledge of iPads did not exist, only reading skills (Lexile Levels and MARSI strategy) were used in the participant selection.

In the literature reviewed for this study, researchers supported the purposeful selection of participants (Anderson, 2003; Behalova, 2010; Sheorey & Mokhtari, 2001; Kymes, 2007, Roberts & Roberts, 2008) The rationale for the relatively small number of participants selected was supported by Coiro and Dobler's research (2007) indicating that a more focused study would produce richer details on the research topic. The purposeful selection of eight students allowed me to focus more closely on the individual details of each participant as they read nonfiction text using the iPad. An additional reason for the selection of eight students in this study was that the classroom teacher used collaborative groups, and the groups consisted of four students per team. This provided the classroom teacher with some flexibility in monitoring students throughout the lessons and was beneficial to the researcher in being able to observe a group of students as they interacted. Because video and audio recordings were used, the sample size allowed the researcher to record a table of four students interacting with the text while simultaneously taking observational notes about another group of four students interacting with their text and iPads. Observational notes were often limited, as it was difficult to capture the nuances of the individual as they interacted with the device for reading. Unless the researcher was standing right next to the participant, interactions often went unnoticed. After several observations within the first two weeks, the researcher found that this method of collection was not as fruitful as the think alouds and the video recordings. As a result,

the researcher focused more on the think alouds and video recordings and less on classroom observations.

Another reason for the selection of eight students was related to student mobility. If a student were to move or leave the charter school during the study, the remaining participants would generate sufficient data to support the study. The school had high rates of absenteeism and mobility. During the study, three students in the classroom transferred to other schools. One of the transfer students was a student selected for the study and was, therefore, not available to participate in the study. This brought the number of participants to seven. Student absences also created an issue for the research. Participants had a combined total of 39 absences during the study period. Individual absences for the seven participants were as follows: Anna, 7; Erin, 0; Jerry, 1; Joe, 5; Lori, 10; Roger, 16; and Trey, 0. Pseudonyms have been used to preserve the anonymity of participants.

Researchers have indicated that student selection for verbal reports should be carefully considered, and well-developed characteristics of the subjects should be detailed along with familiarity with think alouds and characteristics of text (Pressley & Afflerbach, 1995). To this end, the researcher chose pre-selection data tools carefully to capture the good readers' characteristics.

Teacher

The teacher participant in this study, Tony Hank (pseudonym), was an eighth-grade social studies teacher who had an interest in technology and expressed a

willingness to work with his social studies block of students and the researcher for the duration of the study. The researcher identified the teacher collaboratively with the school principal, and the eighth-grade team. The principal had purchased a class set of iPads, and she was looking for a strong teacher with technology experiences who would be willing to learn how to use them in the integration of reading instruction in a content area. Mr. Hanks had used technology in the past to support his classroom teaching and learning, and he was anxious to use the iPad.

Mr. Hank had earned a bachelor's degree in history education, a master's degree in education and administration, and speaks French, Arabic, Dutch, and Swahili. He taught for 33 years in the middle and upper grades in the states and internationally in the Netherlands and the Congo. He prided himself in being a pioneer in technology use in the classroom and reported that he used some form of technology since 1988. He has also served as a principal and an assistant principal in Dallas, Texas and Washington, DC, respectively.

Prior to the beginning of the study, the researcher conducted a pre-interview with Mr. Hank to determine what reading strategies were regularly taught in his social studies block and what technology was typically used in the classroom. Mr. Hank has used a smart board and mimeo board as well as doc camera and a hand-held tablet for teaching for the past few years. There were currently four desktop computers in his classroom, but he indicated usually checking out a rolling laptop cart for extended lessons. His biggest concern was making connections to the standards and aligning them with the Common Core State Standards. Tony's teaching focus was truly on the social studies concepts, and

reading strategies were usually taught in the reading classroom not in his classroom. In his role as the teacher participant, he facilitated the nine-week unit on the Holocaust (see Appendix A).

Throughout the study, the researcher met with Mr. Hank approximately twice each week to discuss any questions or issues that arose during the study and to plan for the next week's lessons. The researcher worked very closely with Mr. Hank to incorporate reading strategies into the Social Studies lessons. Mr. Hank had strong content knowledge of the Holocaust but felt apprehensive about creating a lesson plan that incorporated social studies, reading strategies, and technology. The researcher and Mr. Hank meet bi-weekly to discuss the progression of the lessons and to develop an outline of what should be taught. Common Core Standards were also new to Mr. Hank; thus, the researcher bridged the connections between CCSS and the lessons. The researcher emailed the lessons to the classroom teacher for input prior to the start of the week. For the first few weeks after discussing the lesson with Mr. Hank, the researcher composed the lessons for the week and send them to him for implementation. As Mr. Hank became more comfortable in using reading strategies, the iPads, and social studies content for lesson studies, he assumed the task of writing the lesson plans. Weekly lesson plans often incorporated reading strategies, i.e., identification of main idea, summary, and supporting details. Also included were content area strategies such as evaluating primary and secondary resources, critical thinking questions and content related vocabulary strategies and graphic organizers. As lessons developed, reciprocal

teaching was introduced which involved question answer relationship (QAR) as well as determining meaning of words, phrases, and text.

The researcher held a two-hour faculty development workshop the semester prior to the study and introduced all faculty at the school to the strategy of QAR. Think alouds were a new concept for the classroom teacher as well, and through planning and discussion the classroom teacher ended every class period with a read aloud- think aloud. The researcher and the classroom teacher discussed the text and the purpose for the read aloud-think aloud, which was to model thinking strategies.

During the first week of the study, the researcher and the classroom teacher spent the entire week, approximately one hour each day for five days, exploring the device. Monday began with a simple tutorial on the iPad, turning the device on and off and introducing students to touch features such as onscreen keyboard and sticky note feature. Students had the opportunity to explore the features of the device while the researcher observed their interaction with the device. Tuesday's session was focused on general navigation, locating and opening search engines, using key terms to locate websites, refresh, back, and forward movement on the iPad as well as the exploration of apps that were preloaded on each device. Students had the opportunity for self-exploration at this time on the device. The classroom teacher and the researcher walked around to assist students if needed. On Wednesday, students were introduced to the iBook and the books that were preloaded onto the device. Using the text, *Anne Frank and the Children of the Holocaust*, students performed specific tasks that introduced them to some of the features of the text. For example, after locating and opening the e-book, students were instructed

to locate the table of contents. Once they found the table of contents, they were asked to hyperlink to Chapter 4. While in Chapter 4, they were instructed to locate and define the word, “bouquet.” Once they found the definition, they were instructed to use a sticky note to write a note about the word, bouquet. It is important to note that this time was used as an explorative period during which students gained familiarity with the features of the device. On Thursday, student completed the MARSII survey on the iPad, and on Friday, they used the iPad survey to complete the iPad survey. Both surveys were administered using Qualtrics survey software. The unit of study took place from September 4 to November 15, 2012.

Role of the Researcher

The role of the qualitative researcher can vary based on the data being collected. For the purpose of this study, the researcher was identified as a participating observer. For a portion of her time in the classroom, the researcher was a passive observer, gathering data without disturbing students. To accomplish this, the researcher spent significant time (approximately 12 weeks, three times a week) in the classroom to gain access and be accepted by the individuals being observed. The researcher, however, became an active observer, joining the group to capture think alouds. Two to three times a week the researcher would observe a group of students as they worked on their classroom assignments and reading. The researcher would listen to the students reading and periodically stop them to ask them why they were doing a particular task. For example, if a student was highlighting key vocabulary terms, the researcher would ask

the student to retrospectively discuss what he or she was doing and why. This process helped the researcher capture data related to student learning and strategy use. Creswell (1998) supported the notion of qualitative researchers' taking an active role in the research. Appendix B provides a detailed description of the roles of the researcher and the classroom teacher during this study.

Research Questions

This exploratory collective case study was designed to investigate the following primary research question: How do eighth-grade students read nonfiction text using the iPad?

According to qualitative researchers, sub-questions use the phenomenon of the central research question and divide it into subtopics for investigation (Creswell, 2007). The following sub-questions were addressed in this study to answer the primary research question:

1. What reading comprehension strategies do eighth-grade students use to read nonfiction text using the iPad?
2. What role do the iPad features play in the reading process?

Sources and Collection of Data

Metacognitive Awareness of Reading Strategies Inventory (MARSİ) Version 1.0

The Metacognitive Awareness of Reading Strategies Inventory (MARSİ) Version 1.0 (see Appendix C) was one of the three tools used to identify eight participants in the study. The MARSİ was administered to all students during the first week of the study to determine their perceived use of strategies to facilitate reading comprehension in print text prior to starting the observations and think alouds (Mokhtari & Reichard, 2002). The MARSİ is a 30-item instrument designed to measure readers' metacognitive awareness' of reading strategies and is a highly reliable tool (.89 reliability) used to determine behavior and strategies good readers use when they interact with the text to read academic or school related material.

At the time of the study, there was very limited research available on assessing students' metacognitive reading awareness with digital text, and the researcher used the MARSİ to develop a baseline for strategy use. Currently, a modified version of the MARSİ has been piloted with American undergraduate students (M-MARSİ), and results indicated that the overall survey reliability showed a Cronbach's alpha of .82 (Behalova, 2010). At present, there was no data available for adolescent use of the modified M-MARSİ. Therefore, it was determined that the MARSİ would be a more reliable tool for a baseline indicator for strategy use for adolescent readers. Data from the MARSİ provided useful information about (a) what strategies students readily used for reading

print text, and (b) students' perceptions about how certain strategies facilitated their reading comprehension. The 30-item instrument used a 5-point Likert-type scale with responses on each item ranging from 1 (I never do this) to 5 (I always do this) "while reading print based school material." Using the MARSİ scoring rubric, eight students were identified as proficient readers and were selected to participate in the present study based on overall average MARSİ scores where 3.5 or above = high, 2.5 to 3.4 = average, and 2.4 or below = low. Strong readers were identified, because good readers monitor and adjust their strategy use throughout the entire reading process, resulting in comprehension of reading. Table 2 shows the MARSİ scores for all eighth-grade students.

Table 2

Results of Metacognitive Awareness of Reading Strategies Inventory (MARSI) Scores for all Eighth-Grade Students

Student	Scale Score	Proficiency
S1	1.6	Low
S2	3.9	High
S3	2.6	Medium
S4	4.2	High
S5	1.62	Low
S6	2.66	Medium
S7	4.05	High
S8	3.74	High
S9	3.06	Medium
S10	2.51	Medium
S11	3.74	High
S12	2.9	Medium
S13	1.59	Low
S14	3.85	High
S15	3.37	Medium
S16	2.2	Low
S17	2.3	Low
S18	3.2	Medium
S19	2.7	Medium
S20	3.18	Medium
S21	2.3	Low

iPad Use Survey

An iPad Use Survey (see Appendix D) was administered during the first week of this study to all students to gauge their familiarity with the device, general use, and engagement with the iPad. The results of the survey were used to build a more complete picture of students' experiences with the iPad as they interacted with the text and the device to create meaning. The 16-item instrument used a 5-point Likert-type scale with

responses on each item ranging from 1 (I never or almost never do this) to 5 (I always or almost always do this) to collect data about student use of an iPad. Two additional items included (a) a request that students indicate the number of hours they used an iPad in an average week and (b) an open response item permitting students to add an additional comment. Familiarity criteria were determined to be high, average, or low based on average scale scores where 3.5 or above = high, 2.5 to 3.4 = average, and 2.4 and below = low. As shown in Table 3, the survey revealed that prior knowledge of iPads was determined to be very limited with 84% of the class scoring at the low level for iPad use. Therefore, the researcher relied on the other two tools to identify proficient readers. The iPad survey was, however, used in the data analysis.

Table 3

Results of iPad Use Survey for all Eighth-Grade Students

Student	Scale Score	Familiarity
S1	1.9	Low
S2	3.12	Medium
S3	2.06	Low
S4	2.25	Low
S5	2.25	Low
S6	1.68	Low
S7	1.5	Low
S8	1.0	Low
S9	2.31	Low
S10	1.25	Low
S11	2.68	Medium
S12	1.43	Low
S13	1.5	Low
S14	3.06	Medium
S15	2.81	Medium
S16	1.25	Low
S17	2.33	Low
S18	1.0	Low
S19	1.0	Low
S20	1.43	Low
S21	1.0	Low

Lexile Level Data Collection

Lexile Measurement™ was developed by an educational and technology firm, MetaMetrics (n.d.b.). Lexile scores are measures of a student's development in reading ability and are used to determine text readability. A Lexile score can be used to determine the appropriateness of material at the student's grade level. The Lexile scale is an equal-interval scale. Regardless of where students are on the scale, the amount of

growth is equivalent between two points. For eighth graders, the 8th grade equivalent Lexile score is 805L-1100L.

In this study, Lexile scores were organized, categorized, and identified to establish low, average, and high Lexile levels. The criterion that was used to identify a proficient reader was average to high Lexile scores. Using purposeful selection, eight case study participants were drawn from a population of 21 incoming eighth graders with Lexile scores ranging from 660-1128. Current Lexile levels for eighth graders should be between 805-1100L. Table 4 displays the Lexile scores for all eighth graders in the school and their rankings.

Table 4

Rank Order by Lexile Scores for All Eighth-Grade Students

Student	Lexile Score	Rank order
S2	1555	1
S6	1300	2
S9	1255	3
S20	1195	4
S7	1160	5
S14	1115	6
S12	1060	7
S4	1030	8a
S17	1030	9a
S21	1020	10
S1	945	11
S15	935	12
S3	885	13
S8	880	14
S10	860	15
S18	860	16a
S13	830	17
S5	750	18
S16	715	19
S11	695	20
S19	645	21

Note. ^astudent withdrawn

The rationale for using Lexile Levels was to identify proficient readers who display confidence, competence, and control over the text. Lexile levels are used as predictors for reading success. Proficient readers are more likely to offer verbalization of the task through think alouds, and more accomplished readers often have a higher verbal ability and are more successful in choosing and using reading strategies. Proficient readers also often use a more diverse selection of reading comprehension strategies as

they interact with the text. Waxman and Padron (1987) found that younger, less proficient readers often used fewer and less proficient strategies when reading. Singhal (2001) stated that high proficient readers used more cognition, metacognitive, and social strategies. Furthermore, readers who are more successful typically show a strong strategy use and a wider range of strategies. In essence, successful readers know when and how to apply reading strategies. Students took the Florida Assessment for Instruction of Reading (FAIR) the first week of the study. FAIR Testing is used to measure a student's ability to answer comprehension questions after reading a given text. It is also used as an indicator for fluency. The Maze section measures the fluency of silent reading and low-level comprehension. The researcher was granted access to the student data using the FCRR Progress Monitoring and Reporting Network (PMRN). The school's testing coordinator created an account for the researcher so she could log in and review FAIR testing and Lexile Levels. Table 5 shows scores for all three criteria used in the selection of students and highlights the students selected for participation.

Table 5

Criteria for and Selection of Student Participants for Think Alouds

Student	Lexile Score	Rank	MARSI Score	Average	iPad Survey	Average
S ₁	945	11	1.6	Low	1.9	Low
Lori	1555	1	3.9	High	3.12	Medium
S ₃	885	13	2.6	Medium	2.06	Low
Tom	1030	8^a	4.2	High	2.25	Low
S ₅	750	18	1.62	Low	2.25	Low
Joe	1300	2	2.66	Medium	1.68	Low
Trey	1160	5	4.05	High	1.5	Low
S ₈	880	14	3.74	High	1.0	Low
Jerry	1255	3	3.06	Medium	2.31	Low
S ₁₀	860	15	2.51	Medium	1.25	Low
S ₁₁	695	20	3.74	High	2.68	Medium
Anna	1060	7	2.9	Medium	1.43	Low
S ₁₃	830	17	1.59	Low	1.5	Low
Erin	1115	6	3.85	High	3.06	Medium
S ₁₅	935	12	3.37	Medium	2.81	Medium
S ₁₆	715	19	2.2	Low	1.25	Low
S ₁₇	1030	9 ^a	2.3	Low	2.33	Low
S ₁₈	860	16 ^a	3.2	Medium	1.0	Low
S ₁₉	645	21	2.7	Medium	1.0	Low
Roger	1195	4	3.18	Medium	1.43	Low
S _{21il}	1020	10	2.3	Low	1.0	Low

Note. All student names are pseudonyms.

^astudents withdrawn

Think Aloud Protocols and Comprehension Strategies

Verbal protocols have been used to provide detailed descriptions of the reading process during reading using concurrent and retrospective think alouds (Pressley & Afflerbach, 1995). They are also used to inform researchers and educators of the readers' use of metacognitive strategies being applied to support reading comprehension. Good readers monitor and adjust their strategy use throughout the entire reading process, resulting in comprehension of reading.

The richness and variability of language is the greatest asset and liability of verbal reporting methodologies. The processes that readers verbalize as they adjust their strategy use are useful if they have the capacity to verbalize effectively. There are three advantages to using protocol analysis: (a) data on cognitive processes and the reader response, (b) access to reasoning and decision-making, and (c) analysis of affective processes (Afflerbach & Johnson, 1984). The aim is to capture what students are actually doing and thinking. Ericsson and Simon (1984, 1993) stated thinking aloud is a natural process and lengthy training is not required. They also stipulated that because at times people forget to think aloud, they endorse reminders or probes.

Olson, Duffy, and Mack (1984) referred to think alouds as one of the most effective methods to capture higher level thinking processes. In Olson et al.'s (1984) research, the collection of empirical data was the central focus of a multiyear grant. Prior to receiving the grant, the researchers collected, think aloud data from 29 adult readers as they read simple stories. The data from the think alouds provided the researchers two types of information about the processing of simple stories. First, the results indicated

that strong readers approached the task of reading with a purpose and engaged in a large amount of predictive problem solving behaviors. Second, readers had a general world knowledge as well as specific story knowledge that they applied throughout their reading. The research revealed important empirical data indices in which question-asking tasks allowed the researchers to “see” what was going on in the skilled readers’ minds while reading simple stories. Furthermore, findings could support useful indicators of the process of reading comprehension on a digital device. Olson et al. also posited that think alouds were a tool that should be used to capture individuals’ differences in comprehension strategies. Rankin (1988) concurred and suggested treating each think aloud participant as a “small” and “tightly focused” case study (p. 122). The literature on think alouds showed a strong theoretical foundation and confirms the value of using think alouds to capture data as the reader explores, reads, and interacts with text. In this study, research on think alouds supported the exploration of the individual experiences of each participant using a collective case study methodology.

According to Afflerbach and Cho (2009), reading strategy research should focus on contextual influences because a more descriptive based research is needed to describe the “intent and orchestration of reading strategies” (p. 85). These researchers wrote that studies that look at individual strategy use might be missing the larger development of how accomplished readers coordinate their strategies or how they negotiate the text in relation to the demands of the text. They believed that a more comprehensive approach was needed, one that focuses on the entire act of reading from start to finish. Block Gambrell and Pressley (2002) made a similar observation, stating that nonfiction text

requires a change in strategy use and the purpose of verbal protocols is to determine what type of strategies students are using as they are reading nonfiction text on an e-reader.

Afflerbach and Cho (2009) synthesized research that focused on think aloud protocols that related to reading on the Internet. They further organized the specific strategies identified in the studies. The authors identified 14 studies using the focus of multiple or inter-textual reading and an additional 32 studies using the criteria of Internet and hypertext reading. The authors used a method of categorizing identified by Pressley and Afflerbach, (1995) in which strategies identified and described throughout all of the studies reviewed were recorded on index cards. Next, the authors sorted the strategies to determine their fit within the categories of constructive response: identifying and learning text; monitoring; and evaluating. Their findings indicated that readers used between-text strategies as well as within-text strategies when reading multiple documents in an Internet environment. This synthesis of research was important to this study, as the identification of reading strategies' through retrospective think alouds were categorized to see how students were constructing knowledge when reading nonfiction text for academic purposes on the iPad.

Ericsson and Simon (1980) addressed various aspects of working memory. They posited that the working memory might exclude a number of thought processes. To compensate, they recommended a follow-up strategy using retrospective questions to add depth of understanding and information of the readers' thought processes. The primary focus of their research was to identify conditions in which readers could verbalize their thoughts with minimal reactive influences on their thinking. One of the major findings

from their research was that protocols provide detailed evidence on the sequence of the thought process through a wide range of tasks. Additionally, they reported that expert readers verbalize thoughts involving planning, evaluation, and reasoning that support their reading. The work of Ericsson and Simon is important to this study to support the use of retrospective think alouds to capture data as students verbalize their thoughts. Pressley and Afflerbach (1995) agreed and stated that retrospective questioning is a strong method for students to use to describe their thought processes. The follow-up questions may allow students to validate a researcher's interpretation of verbal reports. Gibson (1997) cautioned, however, that retrospective data is most reliable when the time between the verbal recordings and the exit interview is relatively short. The selection of think alouds using verbal protocols was of strong importance to this study to provide detailed evidence as to the sequence of task through the protocols.

Reading is constructive and the observations and verbal reports focus on the activities of the reader as they are constructing meaning. The readers' constructive tendencies and response to text determine the type of meaning constructed. Olshavsky (1976) stated think alouds by strong readers yielded more use of contextual clues to figure out unknown words for tenth graders. Additionally, Phillips (1988) found that sixth graders with high proficiency skills more readily shifted strategy use as they encountered difficulty in reading for meaning. Verbal protocol analysis is a methodology used to capture strategies proficient readers are using as they negotiate and navigate text.

Reading requires engagement with text and monitoring of meaning. Students who are strong in comprehension also use strategies to help them retain information as well as

organize and evaluate what they are reading (Block & Israel, 2004). There is a continuum along which readers progress as they first connect and finally internalize thoughts in the process of understanding or comprehending (Block & Israel, 2004). Readers who are having difficulty with the text will spend more time on the cognitive process than on the analysis of meaning (Wolf & Barzillai, 2009). Interactivity with text will be limited; and connective relationships between text and self, text and world, and text to text will be incomplete. Additional researchers have suggested that new strategies may be needed to comprehend information in an online environment (Balcytiene, 1999; Coiro & Dobler, 2007). Balcytiene wrote that though little is known about nonlinear digital reading process, researchers have determined it is an important factor in the age of information. Afflerbach (1990) has noted the importance of both context and structure to the usefulness of strategies. The uniqueness of the iPad adds an additional layer as students can hyperlink between texts as they negotiate meaning.

Constructing Think Alouds with Participants

After careful selection of students, think aloud protocols were used in the study to capture data of strategy use for the selected students. Prior to the formal observations and think alouds, the researcher trained all participants on think aloud protocols. The researcher met with all eight students and introduced them to the task of thinking aloud when using a digital device to read nonfiction text. Participants were encouraged to ask clarifying questions during this introductory step. During the introductory phase, each student was given the opportunity to practice using think alouds (concurrent and

retrospective). The researcher provided feedback as needed. Think aloud protocols are contained in Appendices F and G.

Think aloud training took place during the first two days of the unit of study and the second week of the study. Four students were trained on Monday, and the remaining four were trained on Tuesday. Using the think aloud protocol, the researcher modeled for each student how to perform a think aloud. She instructed each student to read the text aloud through modeling. Using the protocol located in Appendix E, the researcher stated,

As I am reading on the iPad and I come across a word I do not know, the voice inside my head says, “You can highlight that word and do a search of the book, or you can highlight it and use the definition feature.’ I think I will try the definition feature to see if that helps me understand the word better. Good, that helped.” If you hear anything, I want you to stop reading and say it out loud to me. Then you can continue reading until you hear or think about doing something else.

After the modeling, participants had the opportunity to practice and verbalize their thinking aloud as they read the text. Following the second day of training, the eight participants gathered for a debriefing, and the researcher responded to any questions students had about the task of thinking aloud. All students were informed at this time that verbal reports would be video recorded and transcribed following each session.

Retrospective Think Alouds

Students’ reading comprehension strategy use was explored using think aloud protocols. A video camera was placed in the center of the group to capture both audio

and video of the think aloud sessions. The researcher observed the group and encouraged student think alouds as students were reading either *Anne Frank and the Children of the Holocaust* (Lee, 2006) and *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012). The researcher used *The Shoah: 101 Keys to Understanding the Holocaust* for the majority of think alouds, as it resembled a closer representation of an electronic textbook. The book had many nonfiction text features: table of contents, glossary, headings, sub headings, key vocabulary, captions, and pictures/videos. *Anne Frank and the Children of the Holocaust* was used for a small portion of the think alouds, as it was narrative nonfiction and had few nonfiction text features. It was, however, the main text used for lesson studies in the classroom. Verbal protocol analysis, a method used for collecting and analyzing verbal data about the cognitive process of reading for meaning, was employed. Verbal reports are produced under specific instructions related to think aloud protocols. Concurrent reports are made while students are completing tasks, and retrospective reports are made after the completion of tasks. The verbal reports are then transcribed and segmented into units, statements, or codes. In order to answer sub-question one, verbal protocols were used as the methodology to capture students' thoughts and actions as they engaged in reading nonfiction text on the e-reader. An example of a verbal protocol is provided in Appendix E.

In each session of think alouds, the identified eight students read preselected excerpts from *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012) and *Anne Frank and the Children of the Holocaust* (Lee, 2006) (see Appendix F). *Anne Frank and the Children of the Holocaust* was a narrative nonfiction text that looked at the

life of *Anne Frank* in chorological organization against the significant events of the Holocaust. Lee, the author, used photographs, illustrations, and short excerpts of diaries, autobiographies, and letters from other children who endured personal experience similar to Anne Frank's throughout the Holocaust. The author used these experiences to contrast Anne Frank's life in hiding with other children of the Holocaust, offering multiple perspectives through a child's eye. *The Shoah: 101 Keys to Understanding the Holocaust* is an electronic textbook that is only available through iBook's 2 and can only be viewed on the iPad. It is 266 pages in length and offers high-resolution pictures, maps, video, audio, captions, and facts in a multi-touch format. The textbook offers interactive review of questions, clickable glossary, note taking, highlighting, and review cards. This textbook was designed for students in Grades 7-12 and allows students' to interact with events, people, places, and concepts in a multi-touch textbook. Verbal reports were video recorded to capture both audio and video and analyzed to determine what strategies students used to develop reading comprehension of text. Immediately following each session of think alouds, the researcher asked the students to reflect (retrospectively) and verbalize the strategies they used to overcome or enhance reading comprehension in the concurrent stage of verbal protocols.

The retrospective reflections were initiated by the researcher during the observations of the think aloud sessions. These think alouds were videotaped to capture interactions with device and e-tools used to support learning, as it was essential to intertwine facial expression, body language, verbal reports, and turning of pages as well as hyperlinks used. The video clips were used to capture how students engaged,

interacted, and explored the text supported on an iPad. Screen shots were used to capture and analyze their use of e-book tools. The researcher asked students during the retrospective think alouds to clarify and confirm their thinking and how and why they made certain decisions as they were applying the metacognitive strategies in the concurrent stage of think alouds.

The intent of the researcher in using retrospective think alouds was to elicit descriptive details related to students' strategy use to facilitate reading comprehension as they interacted and engaged with the nonfiction reading on a digital device. The rationale for using retrospective think alouds was to understand readers' thought processes as they carried out discussion making activities to enhance their understanding of the text. Retrospective think alouds guided the discovery of the readers' actions. They were useful in revealing the mental processes, which were taking place for readers while reading. An example of a retrospective think-aloud is contained in Appendix G.

Once again, the researcher spent significant time modeling a retrospective think aloud for the participants using the retrospective protocols shown in Appendix G. The researcher reiterated how they performed a think aloud in the previous session, stating:

Remember how we practiced thinking aloud as you were reading on the iPad.

Well, again I will be video recording our session as well as taking notes. Your thinking aloud helped me to visualize what you were thinking and doing to support your reading. Well, sometimes, we perform a strategy without thinking.

After completing a task, I will ask you to recall what you were thinking as you completed the task. For example, "After highlighting a word I decided that I

wanted to search for that term, I followed the hyperlink to Wikipedia and I searched for the definition of the word. During this process, I was thinking about my purpose: “Why do I need to know this word? What will I do when I find the word? How will it help with my understanding of the text? How do I get back to the story I was reading using the iBook app on the iPad?” I may stop you during your reading and ask you why you did something at that time; I would like you to tell me everything you were doing that involved the task.

Retrospective think alouds required a little more practice and modeling than did the think alouds. Students often reflected without explaining why they were doing something.

The researcher had to revisit this concept several times for some of the less verbal participants, whereas the verbal students understood this concept immediately.

Retrospective think aloud statements produced by the participants were coded and categorized according to the strategic activities identified by Pressley and Afflerbach (1995) as being used by readers before, during, or after reading (see Appendix H).

Classroom Observations

The researcher conducted classroom visits two to three times per week for 12 weeks to observe and record interactions with the technology as students read nonfiction text. An observation protocol (see Appendix I) was used to document student use.

Classroom observations were intended to yield descriptive data related to students’ interactions with the iPad as they read both *Anne Frank and the Children of the Holocaust* (Lee, 2006) and *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd,

2012). Throughout the duration of the study, observations became less effective as it was difficult to capture the interaction as it was happening. It was also difficult to see what was going on as students held the device in various ways making it difficult to see the screen at all times. It was more effective to review the videos for observational notes. Field notes served as a fidelity check. They were used to document observations of students as they interacted with the device to determine what features of the iPad they used and the role of specific features on their reading process. They were also valuable in assisting the researcher to determine if anything had been missed in the review of videos or in observations. Although all students in the class were observed and anecdotal records were maintained documenting interaction and engagement used to facilitate reading strategies, the primary focus was on the eight students selected for participation using Lexile scores, MARSI levels, and iPad survey. The researcher focused primarily on the participants and their interaction with the device, their interaction with their peers, and their strategies used to support their learning.

Pre- and Post-Interview Surveys

One-on-one interviews with the eight participants were video recorded, and hand written notes were taken prior to and at the conclusion of the 12-week study. The pre-student interview protocol (see Appendix J) consisted of 16 questions designed to provide the researcher with detailed information about the prior experiences students had with the iPad and to explore students' iPad preferences. Several of the pre-interview questions were used to determine if students owned or currently used an iPad. Student interviews

enabled the researcher to obtain detailed information (and not directly observed) about what iPad features students used to support their reading strategies.

At the conclusion of the study, a post-student interview protocol (see Appendix K), consisting of 14 open-ended questions, was used to conduct interviews with each of the seven remaining students. Students were asked to reflect on their experiences with the iPad and discuss features of the iPad they used to support their reading and comprehension of digital text.

Teacher Interview

The teacher interview was conducted using the Teacher Interview Protocol (see Appendix L) to obtain a more detailed perspective of technology use in the classroom for teaching as well as teacher familiarity with technology and the implementation of strategies that support learning. It allowed the researcher to better understand the context of the research. The interview was video recorded and supplemented with hand written notes taken by the researcher. The recording was transcribed to determine the teacher's prior knowledge of reading comprehension strategies and role and use of technology (iPad) in his instruction.

Procedures Used to Conduct the Study

Approval of the Study

The researcher contacted the school principal of the target school about the study and obtained permission to conduct the study at her school (see Appendix M). Prior to initiating any research, an application for human-subject approval from the Institutional Review Board (IRB) of the University of Central Florida was submitted and approved (see Appendix N). Prior to their participation in the study, all participants completed required informed consent documentation indicating their willingness to participate in the research (see Appendix O).

Time Line

The eighth-grade social studies unit began the week of August 26, 2012 and concluded on November 15, 2012. Appendix A contains a detailed schedule for the unit and the observations conducted by the researcher.

Text Selection

Prior to beginning the study, and for the purpose of downloading nonfiction text on the iPad, the researcher and the classroom teacher reviewed various nonfiction books for the unit the teacher was planning to teach during his social studies block. Keeping the theme of the Holocaust, the researcher and the teacher considered the following texts:

Number the Stars (Lowery, 1998) Lexile level 670; *The Diary of a Young Girl: Anne*

Frank (Frank, 1991) Lexile level 1080, *The Cage* (Mensky-Sender, 1986) Lexile level 500, and *I have Lived a Thousand Years: Growing up in the Holocaust* (Bitton-Jackson, 1997) Lexile level 720. After reviewing the e-book, *The Diary of a Young Girl: Anne Frank*, the researcher and the classroom teacher found that only the Definitive Edition was available as an iBook. The researcher and classroom teacher discussed the content and decided to identify another text that was more appropriate for eighth graders. The Definitive version contains candid discussion about Ann Frank's awakening sexuality which may have been problematic given the maturity level of the group. Thus, after numerous searches, the following e-books were identified: *Anne Frank and the Children of the Holocaust* (Lee, 2006) and *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012)

Anne Frank and the Children of the Holocaust (Lee, 2006) is a narrative nonfiction text that weaves historical accounts of a young girl hiding from Nazi capture with other diary entries, autobiographies, letters from children, and their accounts of the Holocaust during Nazi rule. The life of Anne Frank is chronologically organized against the significant events of the Holocaust. Using photographs, illustrations, and brief excerpts from letters, diaries and autobiographies of other young children who had personal experiences similar to Anne Frank, Lee (2006) chronicled what it was like to explore life, love, and question the meaning of life as a teen under extraordinary circumstances as a child living under Nazi rule.

The Shoah: 101 Keys to Understanding the Holocaust (Hurd, 2012) is a multi-touch textbook that offers high resolution of video, pictures, maps, audio captions and

facts related to the significant events. It depicts events, people, places and concepts of the Holocaust in true nonfiction (informational text format). This electronic textbook offers an interactive review of end of chapter test questions, a clickable glossary, table of contents, headings and subheadings as well as key vocabulary hyperlinked to the glossary.

Anne Frank and the Children of the Holocaust (Lee, 2006) had an interest level of Grade 6-8. It was a narrative nonfiction book about the Holocaust, prejudice, tolerance, courage and self-esteem. *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012) was grade appropriate for students in Grades 7-12. Neither book had published Lexile levels, so the researcher contacted The Lexile Framework for Reading to request access to the Lexile Measure analyzer. The researcher was granted access to the software and analyzed each text for the Lexile Level. *Anne Frank and the Children of the Holocaust* (Lee, 2006) was determined to be a 920 Lexile level, and *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012) was determined to be a 1,180 Lexile Level. The researcher and the classroom teacher selected excerpts from both texts to facilitate the think aloud protocols with the eight selected students (see Appendix F). All of the excerpts were reviewed to ensure appropriate reading levels using The Lexile Framework for text. The Lexile analyzer was used to identify word count, mean sentence length, mean long word frequency, and current Lexile levels. Both the researcher and the classroom teacher believed this nonfiction book was closer to the incoming eighth graders' readability levels than any of the other texts. In addition, it was available as an e-book download. Because the classroom teacher was using this as a semester-long unit

of study, the researcher downloaded this e-book and the e-textbook onto all 22 iPads for classroom use prior to the beginning of the study. The unit of study was framed around the social studies curriculum and focused on the following elements: history and change over time, impact of historical developments and consequences associated with these developments, propaganda, and recognition of how lives can be changed by people and events. The major elements of study were connected to the Holocaust, World War II, lessons on propaganda, and concentration camps.

Pre-Study Week Activities

Prior to starting the study, all students spent approximately one hour, five days a week for one week exploring the iPad. They had the opportunity to visit websites related to a social studies related topic. The classroom teacher and the researcher decided to use *Abraham Lincoln* (n.a.) because it was available as an e-book, and it was free through the Gutenberg Project as an e-book on the iPad. Using *Abraham Lincoln*, which was preloaded in the school's elibrary, the researcher explained accessible features, i.e., bookmarks, search, highlighting, hyperlinking through search, define, and sticky notes. She also modeled some of these features, exploring websites related to the e-book. This activity was used to develop students' prior knowledge of using the iPad. In this phase of the research, the researcher was only concerned with how students accessed the websites, not how they evaluated them. The researcher completed whole class lessons on the iPad, e.g., turning the iPads on and off, lighting, screen adjustment, font adjustment, hyperlinks, and access to iBooks, dictionary, and sticky notes. As part of the whole class

lesson, the researcher introduced students to iBooks and showed them how to open and read using iBooks and features associated with iBooks text. After the whole class lesson, the researcher worked with individual students to further explore features and functions of the device. Students were observed interacting with the device, often offering peer assistance as they uncovered new learning. For example, one student found that punctuation could be added to the end of a written sentence simply by double clicking the space bar in notepad. Another student found that screen orientation just required the rotation of the device.

The Study Activities

During the study, the researcher observed students in their naturalistic setting. Each student was assigned to an iPad for the duration of the study. During this study, students did not take the iPads home or use them in any other class. The researcher observed and video recorded student interactions, think alouds and engagement with the iPad two to three times per week. During this time, the researcher asked the selected students to participate in think aloud protocols using excerpts from *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012) and *Anne Frank and the Children of the Holocaust* (Lee, 2006). The researcher adjusted the schedule to meet the needs of the classroom teacher and those of absent students.

Data Analysis

Qualitative data collection and analysis were used in this collective case study. This decision was influenced by the purpose of this study which was to investigate the experiences of eighth-grade readers as they read nonfiction text on an iPad for academic purposes. It was further supported by the previous research completed in the pilot studies. The researcher also investigated reading strategies used to support students' reading and the features of the iPad used to support their reading process. A collective case study allowed for analysis of student performance at two levels: within each case and across the cases (Yin, 2003). The infancy of New Literacies and the lack of research on the topic led to a collective case study approach that would provide rich, in-depth descriptions from multiple data sources about the phenomenon under study (Tashakkori & Creswell, 2007).

Analysis of Verbal Reports and Observations

All think aloud sessions were video recorded to capture students' thinking processes while reading nonfiction text on an iPad and their interactions with the text and the device. Immediately after each session, the researcher transcribed the recordings verbatim and coded each unit of think alouds based on strategies used by eighth-grade readers as they engaged, read, and interacted with an e-reading device for social studies content reading. Codes were then captured as individual units and placed on color coded sticky notes. Coffey and Atkinson (1996) stated that researchers must organize and manage the most meaningful pieces of information. Therefore, think alouds were

separated into units of thought and placed on individual sticky notes. Each student had a unique color sticky note. All codes were verified by two people (researcher and graduate student) coming to agreement to achieve inter-rater reliability. Prior to coding and aggregating the data, the researcher and the graduate student met several times for an extended period of time (two to three hours each session) to discuss the research and the coding process. Subsequently, the researcher and the graduate student met weekly to code and discuss think aloud data and observations. After reaching agreement, the researcher copied all units of think alouds onto individual sticky notes (see Figure 1).

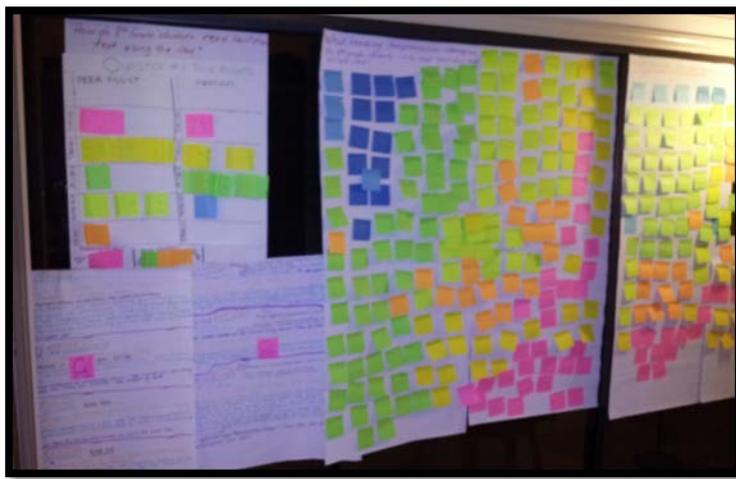


Figure 1. Data Coding Using Sticky Notes

All three questions were posted on a large board, and the researcher and graduate student began aggregating the think aloud data based on the questions. After all posted notes were used, the two raters considered one question at a time and began looking more

closely at the themes that were emerging. Because the sticky notes were color-coded, it was easy to identify students' use of strategies within and across the group.

Codes categorized by Pressley and Afflerbach (1995) for verbal protocols of reading (see Appendix H) were used to guide the researcher through the coding process. This process allowed the researcher to capture strategies before, during, and after reading. This process allowed for all verbal reporting to become valuable. Johnston, Afflerbach, and Weiss (1993) were able to identify over 20 strategies used more than once using verbal recording during their study. In this study, only strategies that were identified more than once were used, whereas Jacobson (1973) categorized all strategies into two distinct groups (textual and non-textual). Using the strategic activities identified by Pressley and Afflerbach (1995) and displayed in Appendix H, the researcher captured strategies used before, during and after reading. The checklist served as a fidelity check for strategies observed during recorded sessions. The researcher used the check sheet and the video/audio recordings to determine strategies identified.

Retrospective protocols were used to support awareness of how and why students used comprehension-monitoring strategies as they engaged in nonfiction text on the e-reader (iPad). After identifying the reading comprehension strategies used (e.g., rereading, questioning, inferring, identification of important information, and activation of prior knowledge), the researcher asked the verbal reporter to clarify why or how that particular strategy supported his or her understanding. It was the intention of the researcher to determine what strategies students were using and how the strategies were being used. Strategic readers know what strategies to use and when to use them. They

are also aware of metacognitive strategies used to support reading comprehension (Yang, 2000). Reading is highly individualized and most readers create a unique combination of strategies to support their learning. This investigation focused on how students supported their learning on e-readers. Classroom observation and interview protocols were used to provide data to answer the research question.

Analysis of Survey and Interview Data

The MARSII was used to determine what strategies students already had in place to support their learning. This diagnostic tool was used to determine a baseline for strategy use currently taking place in print text. Student interviews were video and audio recorded to determine students' familiarity with the iPad. The post-interview was designed to analyze students' perception of the iPad as a tool used to support 21st century learning. Though eight participants were originally identified, one participant left the school. Thus, the narratives or case studies were developed each of the seven remaining participants using student responses. It was these individual cases that were reviewed to identify emerging themes. The individual reports and themes permitted the development of a collective case study or a snapshot of the whole.

The teacher interview was used to obtain a more detailed perspective of the context of technology used in the classroom along and implementation of strategies to support learning. The interview was used to develop a foundational understanding of typical technology used in teaching social studies in the teacher participant's classroom.

Establishing Trustworthiness

Member Check

Member checking is an opportunity, formally or informally, for members to check the data collected to determine if the interpretations of the researcher have been accurate. According to Lincoln and Guba (1985), “The member check, whereby data, analytic categories, interpretations, and conclusions are tested with members of those stakeholder groups from whom the data were originally collected, is the most crucial technique for establishing credibility” (p. 314). Therefore, at the end of the study, each student read their think aloud notes to create a member check. If they felt anything was captured incorrectly, the researcher and the student reviewed and discussed the transcripts. The members verified all transcripts, and all agreed that the transcriptions captured them accurately.

Triangulation of the Data

Creswell (1998) posited that qualitative research is an extensive collection of data, using multiple sources, including interviews, observations, and audio-visual materials. Several data sources that were used in this study were discussed in the instrumentation section of this chapter. They include: teacher interview, student survey, identification of strategies using the MARSII to develop a baseline, field notes, verbal protocols, retrospective think alouds, observations of students reading and interacting with

nonfiction text on the iPad in their social studies class, and pre-and post-interviews with students.

Silverman (1993) stated that using multiple methods to capture data helps to corroborate the findings. This form of data collection is called triangulation. Using a variety of theories and methods can produce a more accurate account of the events. This method allows the researcher to draw the same conclusions from a variety of methods and serves to validate the research. Triangulation of data was used to assure completeness of findings or to confirm findings. By confirming different data findings, researchers can overcome limitations often associated with a single form of data collection. Additionally, uncovering the same information from more than one vantage point helped the researcher describe how the findings occurred under certain circumstances. A variety of methods were used in this study to build a rich descriptive picture of the data. The method of analysis for data triangulation (Yin, 2003) that was used in this research was the constant comparative method (Glasser & Strauss, 1967). The constant comparative method involves comparing one segment of data with another to determine similarities and differences of data collected.

Inter-rater Reliability

The researcher and a graduate student, through weekly meetings to review coding of think alouds, established inter-rater reliability. The researcher and the graduate student met initially to provide for training on coding of think alouds, interviews, and observations. The two met for one hour to review a think aloud together to come to a

consensus on a common understanding of the criteria for the codes. Bailey (1998) stated that inter-rater reliability is established when two or more individuals agree on the evaluation of the same data using the same criteria.

The researcher and the graduate student occasionally differed on the vernacular used for coding. When such disagreements happened, they discussed the intent of the terminology and agreed upon a common language. Using the formula (number of cases that received the same rating divided by the total number of cases received by the two raters), it was identified that the first think aloud scored a 67% rating. The first think aloud scored a low rating because of the vernacular. After discussion, common terms were agreed upon and review of think alouds showed stronger consensus. An analysis of the reliability showed an 82.85% rating. According to Barrett (2001) a value greater than 0.70 is acceptable for consistency estimates for inter-rater reliability.

Data Collection and Analysis Summary

Table 6 contains a summary of the data collection and analysis procedures along with the rationale and goal associated with the selection of participants. Tables 7-9 contain the same information for the primary and sub-research questions 1 and 2.

Table 6

Data Collection, Analysis, Rationale, and Goal: Selection of Participants

Selection of Participants. Criteria include (a) MARSI survey, (b) iPad prior knowledge using pre-interview data, and (c) reading skills using Lexile levels.

Data Collection: Metacognitive Awareness of Reading Strategies Inventory (MARSI) (N=26)

Data Analysis: Analysis of survey items as well as average to determine and classify use - 3.5 or above high, 2.5-3.4 average, 2.4 low (See Appendix C)

Rationale: My rationale for using the MARSI survey was to assess students' knowledge of reading strategies'. It was designed to measure readers' metacognitive awareness' of reading strategies. It is a highly reliable tool (.89 reliability) that can be used to determine behavior and strategies good readers use when they interact with the text to read academic or school related material.

Goal: This information was used to select eight participants for the case study. Research has shown that students who are proficient readers can verbalize more effectively strategies as they are being used for reading.

Data Collection: iPad Use Survey (N=26)

Data Analysis: Average and frequency of Likert scale items-3.5 or above high, 2.5-3.4 average, 2.4 low (See Appendix D)

Rationale: My rationale for using the iPad survey was to gauge the students' familiarity of device, general use, and engagement with the iPad. It was used to build a more complete picture of the students' experiences with the iPad as they interacted with the text and the device to create meaning.

Goal: This information was used to select participants for the case study. This information helped gauge students' use of device and ease of maneuverability.

Data Collection: Lexile Levels (N=26)

Data Analysis: Scores were categorized and identified for low, average, high Lexile levels.

Rationale: My rationale for using Lexile Levels was to identify proficient readers who displayed confidence, competent and control over the text. Lexile levels are used as predictors for reading success. Research shows that proficient readers are more likely to offer verbalization of the task through think alouds. More accomplished readers often have a higher verbal ability, they are often more successful in choosing and using reading strategies and they frequently use a more diverse selection of reading comprehension strategies as they interact with the text.

Goal: This information was used to select participants for the case study. Proficient readers are more likely to verbalize strategy use through think alouds

Table 7

Data Collection, Analysis, Rationale, and Goal: Primary Research Question

Primary Research Question: How do eighth-grade students read nonfiction text using the iPad?

Data Collection: Retrospective think alouds were used, using a tabletop 360* video recorder to capture and record retrospective think alouds. (N=8)

Data Analysis: Retrospective think aloud statements produced by the participants were coded and categorized according to the strategic activities identified by Pressley and Afflerbach (1995) used by readers before, during, or after reading. (See Appendix H)

Rationale: My rationale for using retrospective think aloud was to understand what is going on in the readers mind as they are carrying out discussion making activities to enhance their understanding of the text. Retrospective think alouds guided the discovery of the readers' actions. It was useful in revealing the mental processes, which are taking place in the readers mind while reading.

Goal: The goal was to select 8 students who displayed characteristics of good readers: average to high Lexile Scores, average to high MARSI levels and some familiarity with the iPad.

Data Collection: The researcher conducted classroom visits to observe and record interactions with the technology as students read nonfiction text. Observation protocols were used to document student use. (N=8)

Data Analysis: Transcription of the observations looking for themes to support findings. Video recordings as well as hand written field notes were used to capture observations. (See Appendix I)

Rationale: My rationale for using classroom observation was to capture a more holistic understanding of how students use the iPad to read nonfiction text. Observation looked at interaction with the iPad to support academic learning. It helped increase the validity of the study as well as provide a deeper-rich understanding of the process of reading on the iPad in a naturalistic setting.

Data Collection: iPad Use Survey (N=8)

Data Analysis: Average and frequency of Likert scale items-3.5 or above high, 2.5-3.4 average, 2.4 low (See Appendix D)

Rationale: My rationale for using the iPad survey was to analyze the students' familiarity of device, general use, and engagement with the iPad. It was used to build a more complete picture of the students' experiences with the iPad. It was used to determine if the device is affecting the ability to read and comprehends digital text.

Data Collection: Student Interviews (N=8) Pre and post

Data Analysis: One on one interviews were video recorded as well and note taking during pre and post (See I and J)

Rationale: My rationale for using student interviews was to obtain more detailed information about student iPad use. It was instrumental in learning things that were not directly observed.

Primary Research Question: How do eighth-grade students read nonfiction text using the iPad?

Data Collection: Teacher Interview (N=1)

Data Analysis: Transcription of the interview to determine prior knowledge of strategies used in classroom teaching as well as technology used (iPad) in the classroom. (See Appendix L)

Rationale: My rationale for using a teacher interview was to obtain a more detailed perspective of technology used in the classroom for teaching as well as teacher familiarity and implementation of strategies to support learning. It also allowed the researcher to get an understanding of the context of the study.

Table 8

Data Collection, Analysis, Rationale, and Goal: Research Sub-question 1

Research Sub-question 1: What reading comprehension strategies do eighth grade students use to read nonfiction text using the iPad?

Data Collection: Retrospective think alouds were used, using a * video recorder to capture and record retrospective think alouds. (N=8)

Data Analysis: Retrospective think aloud statements produced by the participants were coded and categorized according to the strategic activities identified by Pressley and Afflerbach (1995) used by readers before, during, or after reading. (See Appendix H)

Rationale: My rationale for using retrospective think aloud was to understand what was going on in the readers mind as they were carrying out discussion making activities to enhance their understanding of the text. Retrospective think alouds guided the discovery of the readers' actions. It was useful in revealing the mental processes, which took place in the readers mind while reading.

Goal: The goal was to select 8 students who displayed characteristics of good readers: average to high Lexile Scores, average to high MARSİ levels and some familiarity with the iPad.

Data Collection: Metacognitive Awareness of Reading Strategies Inventory (MARSİ) (N=8)

Data Analysis: Analysis of survey items/average were used to determine and classify strategy use - 3.5 or above high, 2.5-3.4 average, 2.4 low (See Appendix C)

Rationale: My rationale for using the MARSİ survey was to assess students' knowledge of reading strategies'. Referencing the MARSİ, I analyzed that data and uses it for the interview; asking them to check or tell which strategies they think they used. The MARSİ is designed to measure readers' metacognitive awareness' of reading strategies. It is a highly reliable tool (.89 reliability) that can be used to determine behavior and strategies good readers use when they read academic or school related material.

Goal: Referencing the MARSİ, I analyzed that data and used it for the interview; asking them to check or tell you which strategies they think they used

Data Collection: Lexile Levels (N=8)

Data Analysis: Scores were categorized and identified for low, average, high Lexile levels.

Rationale: My rationale for using Lexile Levels was to identify proficient readers who displayed confidence, competence, and control over the text. Lexile levels are used as predictors for reading success. Research shows that proficient readers are more likely to offer verbalization of the task through think alouds. These data were used to confirm level of competency of the reader.

Data Collection: Student Interviews (N=8) Pre and post

Data Analysis: One on one interviews were video recorded as well as note taking during pre and post (See I and J)

Rationale: My rationale was to obtain more detailed information about student strategies used in learning things that may not be directly observed.

Table 9

Data Collection, Analysis, Rationale, and Goal: Research Sub-question 2

Research Sub-question 2: What role do the iPad features play in the reading process?

Data Collection: The researchers conducted classroom visits to observe and record interactions with the technology as they read nonfiction text.

Observation protocols were used to document student use. (N=8)

Data Analysis: Transcription of the observations were used to look for themes to support findings. Video recordings as well as hand written field notes were used to capture observations. (See Appendix I)

Rationale: My rationale for using classroom observation was to capture a more holistic understanding of student interaction with the iPad to support academic learning. It helped to increase the validity of the study as well as provide a deeper-rich understanding of the process of reading on the iPad in a naturalistic setting.

Data Collection: Student Interviews (N=8) Pre and post

Data Analysis: One on one interviews were video recorded as well and note taking during pre and post (See Appendix J and K)

Rationale: My rationale for using student interviews was to obtain more detailed information about what features of the iPad students used to support their reading strategy use. It was instrumental in learning things that could not be directly observed.

Summary

In this chapter, the researcher has presented the methods and procedures that were used to investigate the experiences of eighth-grade readers as they read nonfiction text on an iPad for academic purposes. Using a collective case study approach, individual cases were analyzed to establish an initial coding system based on Pressley and Afflerbach's (1995) strategic reading before, during, and after checklist. Using data obtained from the multiple instruments described in this chapter, the researcher was able to present a snapshot or case detailing the experiences of each of seven student participants. These seven cases or snapshots were combined to present a final collective case representing the overall experience of the group.

CHAPTER 4 ANALYSIS OF DATA

Introduction

A collective case study was conducted to investigate the reading strategies seven eighth grade students used to support their reading of nonfiction text using the iPad. It addressed strategies they used to read nonfiction text as well as the features of nonfiction text and the iPad students used to support their reading comprehension.

Throughout the study, the researcher captured the actions of participating eighth-grade students as they engaged in electronic reading of nonfiction text. As students engaged with the device for reading a unit on the Holocaust, they often engaged in research, electronic writing, digital note taking, photographing artifacts, and video book reports. After reviewing the field notes, observations, surveys and interviews, rich dialogue was transcribed from the video recording. Think alouds and observations were captured, transcribed, and coded to identify themes using semantic mapping techniques. Through ongoing and repetitive review of multiple sources of data, the researcher sought to establish patterns and emerging themes to answer the research questions that guided this research. Later stages of analysis generated expanded themes and subthemes. Themes were explored primarily as they related to the collective case study.

This chapter summarizes the analysis of the data and presents the findings with regard to (a) how students read nonfiction text using the iPad, (b) what role the features of the iPad played in the reading process, and (c) what strategies were used to support student reading. The seven eighth-grade students were purposefully selected to

determine how they read nonfiction text using the iPad. Each student who participated in this research was treated as an individual case, and all think alouds, observations, comments, inventories, and interviews were analyzed to answer these questions through triangulation of data. The case studies have been organized in a similar fashion for each student participant. Student think alouds, comments, researcher observational notes, and data obtained from pre- and post-interviews have been integrated as appropriate in the report of each case to answer the primary research and sub-questions which guided the research. To preserve the voice and language of the individual readers, think alouds have been left unedited. Any additions, changes, or clarifications have been noted within brackets []. In this chapter, the findings, organized by the research questions that guided the research, are presented for the seven individual students who completed the study and for the collective group.

Case Study Descriptive Data for Individual Participants

Case Study Descriptive Data for Lori (Student 1)

Primary Research Question: How did Lori read nonfiction text using the iPad?

Lori had high reading comprehension, a high MARSII score, and medium prior iPad use. She was a strategic reader who ranked first in her class based on her Lexile testing. Her current Lexile level was 1555, far beyond the level required for eighth graders (805-1100). She ranked very high on the MARSII which indicated that she had

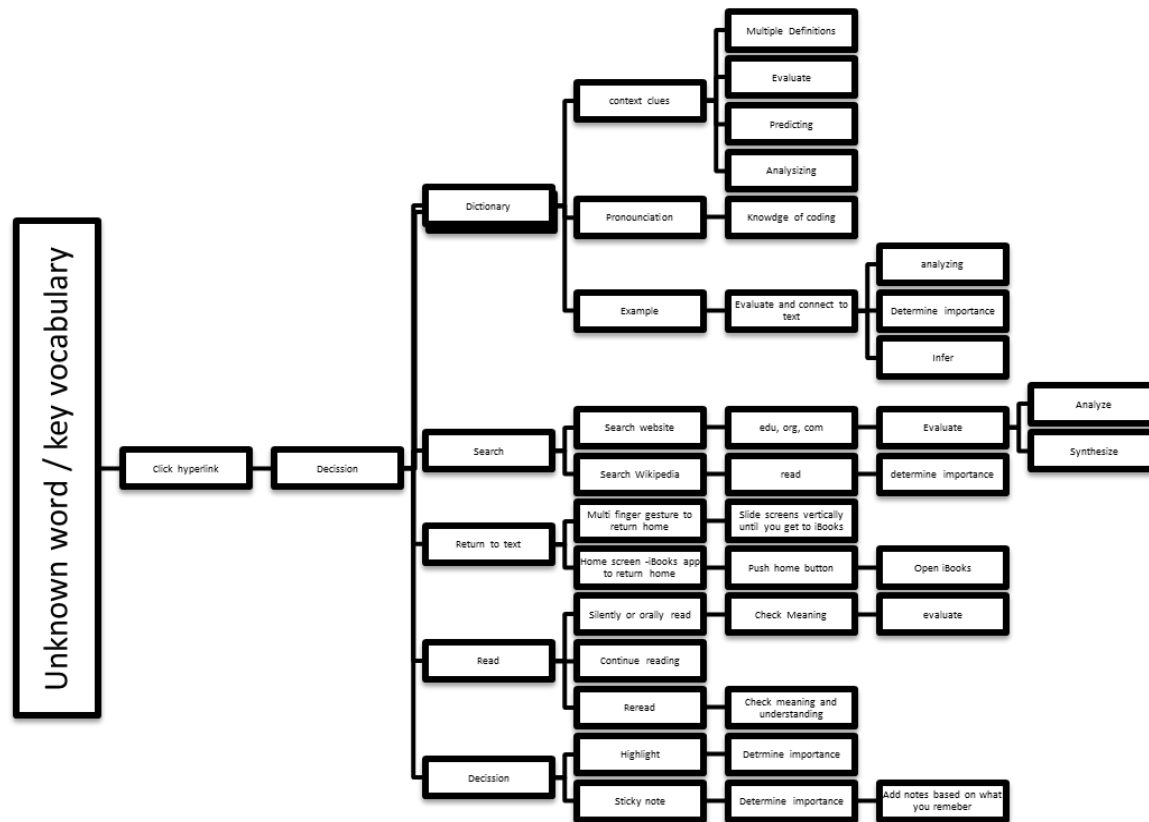
strategies in place as she read print-based material. The problem solving strategies category was the highest for her on her MARSII with several strong indicators showing strong strategy use. She indicated on the MARSII that she “always or almost always” used the strategies of visualization, rereading and guessing meaning of unknown words. Her lowest performance indicators show that she “only occasionally” adjusted her reading rate and “sometimes” noted characteristics of text like length and organization. She also proclaimed that she “sometimes” used reference material such as the dictionary to help her read.

Lori’s iPad survey showed that she ranked in the medium ranking for use of an iPad. After reviewing her results more closely and aligning her answers to her pre-interview, it was noted that Lori did not own an iPad at home and only “sometimes” used the iPad elsewhere. Lori owned an iPod Touch and reported that she often used it to play games, search for information, or for social networking. She stated she had very little experience on the iPad but believed the iPod Touch had the same features as an iPad except for the size. The pre-interview also indicated that Lori had a Kindle and usually used it to read approximately two books each month for pleasure. She stated, “I have to balance my other work, so I read articles and magazines such as *Good Housekeeping* when I can on the iPod Touch using Safari.”

In reviewing Lori’s transcripts from her think alouds, several codes emerged for strategy use. Lori was a strategic reader with strong strategy use as displayed in several of her think alouds. She used a rapid succession of strategies in a short period of time to monitor and repair meaning. She deployed specific strategies such as determining

importance, monitoring understanding, and rereading in rapid information-seeking cycles within a short text or passage. She accomplished this while performing physical reading actions using the iPad to support and expand on existing strategies. For example, when Lori came to an unknown word, she often used the physical action of highlighting and clicking on the word to search for a definition. Also, Lori often wrote notes using the sticky note function on the iPad or highlighting feature immediately after she read the definition.

In reviewing the transcripts from Lori's think alouds, it is important to note that Lori had "layers" of strategies for a simple task. The simple task of looking up the definition of a word became a complex task with multiple physical actions and decisions related to strategy use. For example, a hyperlink led to the physical action of clicking, moving to the dictionary, glossary, pronunciation key, example, or search. Figure 2 provides a concept map of Lori's use of iPad strategies and features to read nonfiction text. Depending on Lori's purpose, that action could lead to additional strategies and or physical reading actions such as: evaluation, inference, determining importance, searching another text, or searching outside of the text.



Note. Each shape requires a physical action of clicking or tapping or multiple gestures.

Figure 2. Concept Map: Lori's Use of iPad Strategies and Features

Further review of interview transcripts indicated that two additional themes emerged: peer assistance and features. Lori was a strategic reader who used strategies such as determining importance and monitoring meaning, and she was eager to assist others when their comprehension failed. She had five instances in which she offered peer assistance to another student as evidenced in the following think aloud:

Erin: "I'm gonna click that because I am not really sure what that means."

(Erin reads definition)

Lori notices Erin struggling to define a word imbedded within the definition. Lori observes Erin trying to click on the text to search for a definition and offers peer assistance.

"Let's go to the notepad and type it in. Then we can look it up."

Lori and Erin scroll through the window and begin typing using multi-finger gestures to get to notepad. Lori notices Erin struggling with the spelling of the word and offers additional assistance.

"Do you want to know how to spell it? Is it i-n-c-a,"

Erin types and then says, "How do you look it up?" Lori models for Erin how to look it up saying, "It's the same as in the book. You highlight it, then define it."

Erin is still struggling with the highlighting feature, so Lori offers to assist her on her iPad.

In regard to her use of both iPad and nonfiction text features and strategies, displayed in Table 10, Lori demonstrated multiple feature use. This was evident in her reading as she read the text, *Anne Frank and the Children of the Holocaust*.

Table 10

Nonfiction and iPad Features Used by Lori

Features	Indicators
Nonfiction	
Audio	2
Context clues	8
Definition	20
Examples	4
Glossary	6
Pronunciation	7
iPad	
Highlighting	32
Hyperlinks	9
Multi-gesture feature	Observation
Search	4
Sticky notes	9

In this electronic version of the text, she relied heavily on context clues because key words were not hyperlinked with colored or bold text. She indicated she read the text in a linear fashion, but she often jumped around the book and used the bookmark or highlighting feature for important information. She often color-coded her highlighting (Figure 3). She described the process she used in dealing with the highlighting feature as follows:

Lori: “I am going to highlight that, and I am going to make that green because that is an interesting fact that I can use on my chart. Then I am looking at the next paragraph and that looks like another important date, and so I am gonna highlight it using green for interesting facts and yellow for important dates.”

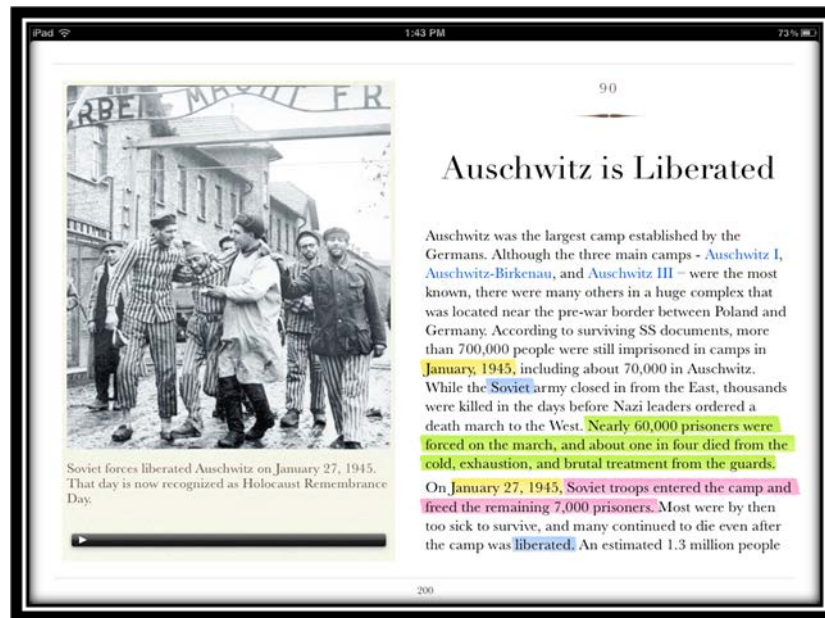


Figure 3. Lori: Selected Highlighting Example

When asked if she used highlighting prior to this study she said, “No, this is a brand new strategy for me. I will continue using this. I read a hard cover book the other day, and it was so hard because I kept trying to turn the page and highlight.”

Another example of how Lori read nonfiction text on the iPad revealed that she used specific features of the iPad to support her comprehension. In the following think aloud, she relied on the iPad and nonfiction features of the electronic dictionary shown in Figure 4.

Lori, reading from text: “In another letter, Mrs. Frank wrote: ‘Our big girl, Margot, is very hardworking and already thinks of going on to college. Little Anne is somewhat less industrious, but very droll.’”

Lori, commenting: "...um I am not sure what that means [evaluation] so I am going to highlight and define it and reread [Uses highlighting and define] It means curious or unusual in a way that provokes dry amusement. [evaluates her understanding]. I am going to read the example, [reads example] so I think it's like a strange sense of humor." [infers based on example]

Researcher: "Did the example help?"

Lori: "Um yeah, I think the example helped me a little bit, [evaluation] but I am not completely understanding what the word is, so [monitoring of understanding, evaluation] I am using my context clues [context clues] and I am looking at the word amusement [reflection] and thinking that it would be a type of humor [word connections]. I am going to reread that sentence just to make sure I understand it." [rereads]

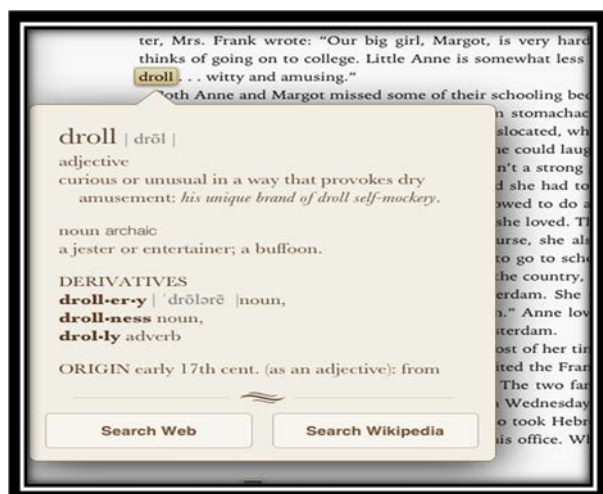


Figure 4. Electronic Dictionary Feature to Support Learning

Lori used features of the iPad and structural features of nonfiction such as headings, bold words, tables, and organizational structure of the nonfiction text to support her understanding. She often used the search feature to look for key words or phrases within the selection as well as other chapters of the book.

In the text, *The Shoah: 101 Keys to Understanding the Holocaust on the iPad*, she believed that she read this book differently, jumping around within the text and using the search and highlighting features more often. She believed this text represented nonfiction text and used the features of nonfiction text to support her reading. Lori also used and relied on hyperlinks for contextual information, often clicking on the “blue” words. She stated several times that *Anne Frank and the Children of the Holocaust* did not have hyperlinks and so she often researched information for *Anne Frank*. . . using *The Shoah*. . . on the iPad. She stated that if she could not find what she was looking for in either text, she simply copied or pasted the text into notepad so she could search outside of the text using Google:

“I did a Google search. I put in Lies [the name of a character] + Pronunciation and this came up, and they have the word in Dutch.”

[Observation] Lori clicks on the audio to hear the pronunciation.

[Retrospectively: Lori describes steps she followed outside of the text to get this information]

“I copied and pasted Lies [someone’s name] into notepad and then linked to Google and researched her name and then typed in the word and asked how to pronounce it.”

Lori read nonfiction text using the iPad differently; she felt that the electronics on the iPad allowed her to search for unknown words or terms. She indicated that if she were reading the same text in hardcopy, she would have to stop to get a dictionary or look it up on the computer. She believed reading on the iPad was more efficient, as it was easier. She explained:

I just think it was easier, I was more interested in it because it was electronic, it was fun. Maybe it's just me but when I was reading on the iPad, it was easier to keep my place. Like in a book sometimes the pages turn and get messed up and sometimes you don't realize that the pages turned and you get messed up. [It was easier to keep my place in the text].

The following sub-questions permitted an expansion of the discussion on strategies and features used to support how Lori read nonfiction text using the iPad.

Research Sub-question 1. What reading strategies did Lori use to read nonfiction text using the iPad?

In reviewing Lori's think aloud transcripts and her MARSIs, both indicated that strategies were already an important reading tool for Lori, and she used strategies frequently to support her reading with the iPad. Lori often reread for clarity and seamlessly integrated the physical reading action of the iPad with a wide range of before, during, and after reading strategies. When Lori was asked to reflect on her strategy use in her post interview, she reported that certain strategies had changed, specifically: determining importance of unknown words, rereading, adjusting rate, and the use of

highlighting. She stated in her post-interview that before the study she just skipped around unknown words, but that currently she relied heavily on the dictionary, context clues, and examples to support her reading and had downloaded a dictionary app for her phone. In her post interview, Lori discussed highlighting as a new strategy she would continue using after the study. She engaged in many reading strategies as she read nonfiction text using the iPad. She often self-regulated her learning showing signs of monitoring and repairing of meaning in rapid info-seeking cycles within relatively, short text passages as displayed in Table 11.

Table 11

Examples of Lori's Before, During, and Post Reading Strategies

Text: *The Shoah: 101 Keys to Understanding the Holocaust*

Before Reading Strategies:

“There is a picture over here and there are a lot of people.” [previews text using picture and caption to guide meaning] “The Law to Remedy the Distress of the People and the Reich,”

During Reading Strategies:

Lori [reading]: “The Reich is also in blue.” [Uses highlight word and hyperlinks to the glossary and definition] “also known as the Enabling Act, was passed by the German Parliament on March 24, 1933. It required a two-thirds majority to pass, and the persecution of opponents and intimidation techniques employed by the SS and SA made the rigged election possible. All 81 Communists and 26 of the 120 Social Democrats were kept from attending the meeting because they were kept in ‘protective detention’ in camps controlled by the Nazis. In addition, SA and SS members were stationed in the Reichstag. The Reichstag was highlighted.” [reads, uses highlight word and hyperlinks to the glossary and definition]

Researcher: “Tell me what that paragraph means. . . .”

Lori: “It is basically telling you about the enabling act, what it means and how it got passed.” [restates literal meaning of paragraph]

Researcher: “What does it mean?”

Lori: “Umm it’s basically they don’t really say, not yet.” [evaluates]

Researcher: “I would like you to reread that paragraph. You can read it aloud or silently.”

Lori: “I kind of want to read it silently. [reads silently]. I think like the enabling act is the law to remedy the people, I think like the first paragraph, I think like if I were to take a guess [makes a prediction]. What it is I think because it says to remedy the distress of the people. It is a lot of propaganda to convince the majority that like races such as Jews and Jehovah witnesses they were like real Germans and so again they used propaganda to making when they call it the law to remedy the distress of the people would mean to get rid of them.” [clarifies, and rereads the entire section again this time aloud].

[continues reading] It required a two-thirds majority to pass, and the persecution of opponents and intimidation.

“I am going to highlight this [intimidation] because that relates to the scare tactics and it is important to our conversation.” [purposeful highlighting, determining importance, and text connections]

“Oh I get it. He locked up the people who he thought wouldn’t agree with what he wanted. That took me a long time to understand that.” [realizes meaning broke down and it takes her a long time to make sense on this section] “It passed 441 to 94, more than the two-thirds required.”

“Oh, just a little note: I think he took everyone that would disagree with him and had them out of there, but I think he was smart because he couldn’t take everyone out or they couldn’t vote. I think that’s why he took the social democrats.” [synthesized this section and inferred]

“He could now enact laws without parliamentary approval and without consulting with President Paul von Hindenburg.”

“Hindenburg [uses hyperlink to see definition in glossary]

“The president’s name is highlighted and I want to know who he is and exactly what he did. [evaluates importance based on blue text]

So, he lived through the Holocaust pretty much, he lived through most of it, he served through the Holocaust.” [evaluation & synthesis]

Post Reading Strategies:

“Like I think that they didn’t really challenge anything because they were really, really scared and they were like taking control of everything, like, and they were getting stronger.” [Infers meaning based on what she has read, synthesizes and reflects after reading]

Note. Think aloud shows evidence of rapid information-seeking cycles within relatively, short text passages displaying before, during and after strategies.

Lori often displayed inferential reasoning during her think alouds, relying heavily on making connections, predictions and summarizing. She used contextual and structural cues to guide her reading for meaning. Lori had strong use for several strategies that supported her reading such as determining importance, rereading, and monitoring of meaning. She often monitored her understanding and showed signs of self-regulation of strategies to repair meaning. Frequencies for Lori's reading comprehension strategies are displayed in Table 12.

Table 12

Frequencies: Lori's Reading Comprehension Strategies

Reading Comprehension Strategies	Frequency
Audio	2
Connections	8
Context clues	8
Determine importance	24
Evaluation	7
Infer	4
Highlighting	32
Hyperlinks	2
Monitoring of meaning	13
Prediction	1
Reflection	4
Rereads	15
Synthesis	2
Vocabulary Definition	20
Vocabulary pronunciation	7

Research Sub-question2: What role did the iPad features play in the reading process as Lori read nonfiction text using the iPad.

In her post interview, Lori commented on the differences in her reading of *Anne Frank and the Children of the Holocaust* and *The Shoah: 101 Keys to Understanding the Holocaust*. She stated that she read *Anne Frank and the Children of the Holocaust* in a normal linear manner (moving from left to right, reading every word), but she also jumped around and used the bookmark feature to mark where she left post-it notes or highlighted important text. She also adapted the search feature on the iPad as she read both texts, often looking up key words using the search feature. This feature allowed her to see how the author used the same word in another section of the text.

When reading *The Shoah: 101 Keys to Understanding the Holocaust*, she found that she used the blue hyperlinks frequently throughout the text, but in the text, *Anne Frank and the Children of the Holocaust*, there was an absence of “blue hyperlinks.” She said she relied on the search feature for words and phrases that she was unsure of in the *Anne Frank* text. She described the process, noting that she inserted the text in a search box and searched to see how and where it was used in the book, often reading different sections of the text to aid her understanding. She often relied on context clues as she reviewed the terms used in the passages to help make meaning of what she was reading.

She indicated that she relied more on features of the nonfiction text in *The Shoah: 101 Keys to Understanding the Holocaust*, indicating, “It was much more informational” and supported her reading of the *Anne Frank* text. Lori interacted with the text to develop intertextuality. In her opinion, reading both books at the same time was

supportive because if there was something in the *Anne Frank* text that needed further explanation, she could look it up in *The Shoah*. Lori stated in her post-interview:

I use more contextual clues in print, and on the iPad I use the definition feature or the search feature to look up words, or the different meanings of the words. I would read all of them and then I would try to deduce which one they meant [the author] and then I would try to figure out [which one to use] and think of other situations and see how they apply and then I would look at the other meanings briefly and see what they meant.

Case Study Descriptive Data for Erin (Student 2)

Primary Research Question: How did Erin read nonfiction text using the iPad?

Erin had high reading comprehension, a high MARSII score, and medium prior iPad use. Erin was a strategic reader who ranked sixth in her class in regard to her Lexile level which was 1115, slightly above the range required for eighth-grade readers (805-1100). She ranked very high on the MARSII, which indicated she had strategies in place for print-based reading. The sub category of problem solving was her highest subscale with several indices stating that she “usually” reread, visualized, thought about what she was reading, and adjusted her reading rate when text became difficult. She indicated on the survey that she “always or almost always” paid close attention to text when it became difficult. Her lowest indicator for strategy use stated that she “never or almost never” read aloud when the text became difficult. This area was one of the biggest changes for

Erin concerning her reading. In her post-interview, Erin discussed how she had begun to read aloud to help support her understanding of what she was reading:

It really helps me to read it out loud, because first of all if I read out loud it helps me to visualize it, and it also has clearer understanding so you know what they are talking about. It's how you say it out loud that affects the tone of the text! I read slower now, and I am not afraid to read out loud if I need to, because I was kind of nervous when I had to read out loud. I don't think I will stumble as much on words and if I do, I will slow down and blend them with other words I saw.

Erin scored "occasionally" on deciding what to read closely and what to ignore as well as determining if the content fit her purpose in two other areas. As shown in Figure 5, Erin's use of highlighting and sticky notes changed the way she perceived the text. She often read to determine importance and decide if the text read fit her purpose for reading.

The following think aloud displays Erin's use of highlighting to determine importance:

I used purple for dates and green for any specific information in *The Shoah* and *Anne Frank*. I used green for things that happened to Anne Frank and sometimes blue or yellow for any definitions. It makes it more, what's the word? Intelligent. The blue [hyperlinks to glossary in *The Shoah*] I really, like using those words. It just helps build my vocabulary.

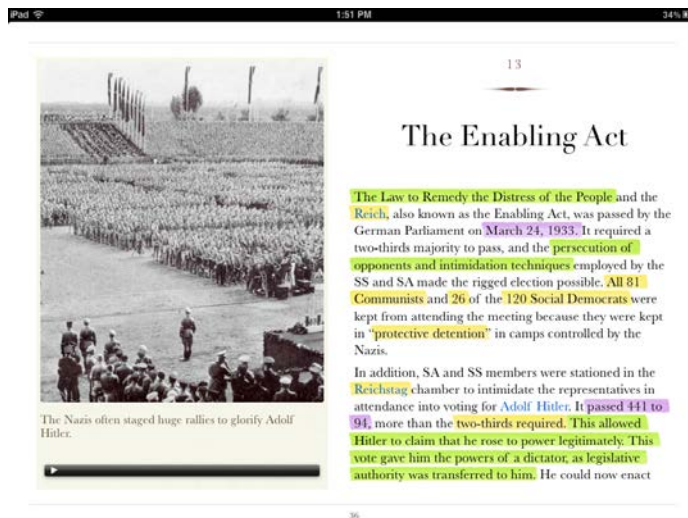


Figure 5. Erin: Selected Highlighting Example

Erin's iPad survey showed that she ranked in the medium range for iPad use. She stated that she "occasionally" used the iPad at home or in an office. In reviewing her results and more closely aligning them with her pre- and post-interviews, it was important to note that her father had owned an iPad for a little over a year. She indicated on her survey that she "always or almost always" used the iPad to connect with friends through social networking, to play games, or listen to music. In her pre-interview, Erin stated that she has read on the iPad using iBooks to read classics like *Moby Dick* or books by Charles Dickens. She had some familiarity with highlighting and often used it for vocabulary words she struggled to understand. She indicated that her mother had a Kindle, and Erin liked the book selection better on the Kindle, which she believed often cost less than books on the iPad. She also liked the Kindle's smaller size and the fact that

for her, it offered fewer distractions. During the post-interview, Erin announced that she had purchased an iPad using her own money.

After reviewing her interview transcripts, two themes emerged: peer assistance and features. Erin often requested peer assistance for help with searching for items outside of the text. She indicated in her pre-interview that she used highlighting frequently to highlight unknown words. This strategy was used extensively, as she highlighted to determine not only meaning but also pronunciation, the area for which she requested the most assistance. Following is an example of this strategy used by Erin in requesting peer assistance for pronunciation:

I am going to highlight this [Branau] to see how that is pronounced [highlights and uses the define button, then hyperlinks outside of the text] ... ah. . . I am on *Wikipedia* but I don't think I want that website. . . Trey, can you help me, how do I see the pronunciation of this? I was trying to see the pronunciation of the city, but it failed. I could search it, but. . . I'll just sound it out.

[Trey shows her how to find it]

Further evaluation showed that Erin had multiple incidences of feature use. Table 13 displays the nonfiction and iPad features used by Erin during the research period.

Table 13

Nonfiction and iPad Features Used by Erin

Features	Indicators
Nonfiction	
Definition	17
Example	4
Glossary	4
Pronunciation key	10
Video	6
iPad	
Font size	Observation
Highlighting	7
Hyperlinks	17
Search	4
Sticky notes	17
Multi-finger gesture	Observation
Night time setting	Observation

Erin believed she read differently on the iPad. She indicated that it was easier to read and that the specific features of the iPad supported her reading. In the following example, she discussed changing the font and the background setting to help her focus more closely on what she was reading:

Researcher: “Did using the iPad affect your reading at all? Was it easier or more difficult?”

Erin: “I would have to say [using the iPad was] easier because compared to the hard cover you have to flip through the pages and you have to look very closely, and I have to get my glasses.”

Researcher: “Did you use your glasses at all with the iPad?”

Erin: “No, you can make the font bigger, smaller, highlight it, and change the background to night feature. It’s really cool.”

Erin further described changing the font size and slowing down her reading: “I adjusted the fonts, made them bigger, and I read slower than I would have read the hard cover books which I thought was going to be the opposite, but I read more slowly using bigger fonts.”

She finished her post-interview with a discussion about changing the background into the nighttime setting, explaining the effect of the change: “I did [use] nighttime [setting] because it makes the font pop out and it helps you concentrate even more.” Examples of the two screen options are shown in Figure 6. It is important to note that this feature of the iPad was not available for all text. *Anne Frank and the Children of the Holocaust* allowed for night feature but *The Shoah: 101 Keys to Understanding the Holocaust* did not support this feature; therefore, Erin had to adjust her strategy for the specific text.

Erin was more purposeful and slower in her reading of nonfiction text using the iPad. She often used the text *The Shoah: 101 Keys to Understanding the Holocaust* to support her reading of *Anne Frank and the Children of the Holocaust*. Erin believed the narrative nonfiction text was much harder to read, and *The Shoah: 101 Keys to Understanding the Holocaust* helped to support what was going on in *Anne Frank and the Children of the Holocaust*. Erin interacted with the text to develop intertextuality. She believed that *The Shoah: 101 Keys to Understanding the Holocaust* helped describe what the Holocaust was like and she supported this with the following statement:

I liked reading it [*Shoah*] because *Anne Frank* was a little harder and *The Shoah* helped to boost it up, I mean what's going on in the *Anne Frank*. . . . it kind of made me visualize what Anne Frank was doing during the Holocaust.

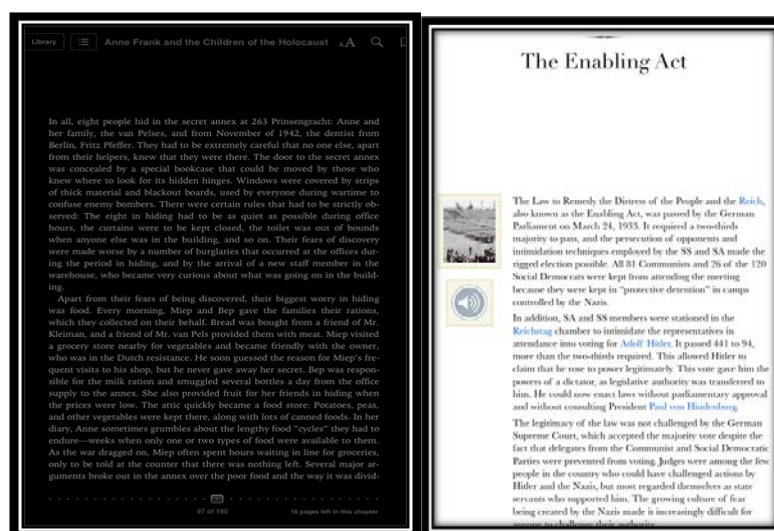


Figure 6. Examples of Normal Background and Night-time Settings on iPad

Erin relied heavily on specific features offered through the iPad to support her reading. Vocabulary was very important to Erin, as she explained in her pre-interview and post-interview: “I look up words in the dictionary, pay attention, and focus on the main points.”

In her post-interview, she expanded on the importance of vocabulary knowledge and how her father helped to support her learning:

I really enjoyed reading *Anne Frank*, and the iPad helped me so much I am just so glad I have one now. I had to convince my parents as to why I wanted to buy it

with my money. My father was, like, ‘You don’t enjoy looking up the definitions with me anymore.’ My dad sometimes puts my vocabulary words into a song, because I have a guitar, and he knows it’s something I enjoy. I like how he uses something I enjoy together.

Throughout the research, Erin displayed this same strategy in several of her think alouds.

I am going to look up maltreatment, because I am not really sure what that means. I am going to click on the blue hyperlinks and read the definition; I am going to read the example. Jehovah’s Witnesses refused to serve in the military. This was contrary to Nazi thinking that all people should give up their individual rights and serve the Fuhrer. . . .I am pretty sure Fuhrer is like a title that Hitler gave. [Looks it up to check her prediction] I am going to start the sentence over. They could have left the camps had they renounced. [Looks up word and re-reads to understand sentence]

In her reading of nonfiction text using the iPad, Erin used a wide array of features, most of which were iPad related to support her understanding of the text. She adjusted the text and the background to help her visually focus better as she read the text. She often used the definition feature as well as pronunciation guide and examples.

Vocabulary was very important to Erin’s understanding of the text. Because of Erin’s strong use of vocabulary strategies, the researcher was interested in determining if that was a strategy that she was already using to support her reading. To accomplish this, the researcher reviewed the FAIR testing sub scores, which are the source of Lexile scores,

and found that Erin's word analysis score was very low (20 %). It was evident that the iPad had features that could support an area of concern for Erin. In reviewing her second FAIR testing scores, Erin's word analysis score increased from 20% to 66%. The following sub-questions provide additional data as to strategies and features used to support Erin's reading of nonfiction text using the iPad.

Research Sub-question 1: What reading strategies did Erin use to read nonfiction text using the iPad.

In reviewing Erin's think aloud transcripts and her MARSII, it was clear that vocabulary strategy use was very important to Erin.

“... there were big words and it was complicated so I slowed down to pronounce the words.”

“Blue hyperlinks were really helpful. You didn't have to highlight. You just click on it and it takes you right to it [glossary] vocabulary words' names.”

“I enjoy using the glossary because if you are looking for something specific you can go back--it will take you there [other sections of the text where it is used].”

Erin relied on vocabulary knowledge as it related to her reading comprehension. This allowed her to build an in depth understanding of the concept.

“I'm gonna click that because I am not really sure what that means [reads definition].” [She does not recognize a word inside the definition--incarcerated--tries to click it]. “I wonder if we can look that up?” Erin continued her search for unknown

vocabulary, saying, “I am going to look up maltreatment because I am not really sure what that means [reads definition]. I am going to read the example [reads the example].”

As noted in these excerpts from transcripts, receptive vocabulary was very important for Erin as the text complexity increased. She also used a variety of strategies to support her reading but vocabulary schema was the most important tool used.

Frequencies for Erin’s use of reading comprehension strategies are displayed in Table 14.

Many of the words identified in her think alouds were content specific, tier two or tier three vocabulary words. Her focus was on conceptual understanding of mature language, as it appeared frequently within the context of the text. Many of her strategies identified built upon her word schema through semantic knowledge about the connections of word meaning to specific concepts and linguistic knowledge of roots and word parts. As she read, she identified vocabulary terms that she had difficulty with and applied vocabulary strategies to support her understanding of the text. Table 15 contains an example of how Erin used vocabulary strategies to support her reading comprehension.

Table 14

Frequencies: Erin's Reading Comprehension Strategies

Reading Comprehension Strategies	Frequency
Audio	0
Connections	8
Context clues	1
Determine importance	2
Evaluation	6
Highlighting key vocabulary terms	7
Hyperlinks	17
Infer	3
Monitoring of meaning	6
Prediction	5
Reflection	1
Rereads	7
Synthesis	1
Vocabulary Definition	17
Vocabulary pronunciation	10

Table 15

Examples of Erin's Before, During, and Post Reading Strategies

Text: *The Shoah: 101 Keys to Understanding the Holocaust*

No Before Reading Strategies Identified

During Reading Strategies

“Jews were the primary target of Nazi hatred and persecution”

“I’m gonna click that because I am not really sure what that means.” [Hyperlink glossary dictionary feature identified meaning break down] [reads definition] There was a word inside the definition [additional word definition needed] that she did not know-- incarcerated. Tries to click it “I wonder if we can look that up?” [Tries to hyperlink within the definition] “I think incarcerated means like buried, murdered dead.” [context clues and prediction]

Scrolls through the windows using multi-finger gesture [iPad feature] to get to notepad. Begins typing [Requested help]. “Do you know how to spell it? [peer assistance] Erin has some difficulty highlighting [peer assistance]

Researcher: “So was it what you thought?”

“It is actually imprisoned. [checks prediction of word meaning discussion] I am going to reread that sentence because I need to understand it.” [rereads the sentence, clarifies]

Remembers that she is reading about the triangles and references [makes connections to previously read sentences] “. . . and I think red triangles are... there’s a picture of them [uses photo for meaning] UGH they’re in German but I am pretty sure they are like supporting the Nazi.” [inferring]

Researcher: “Could you listen to the video? Do you think that will give you any information? Do you think that will be in German?”

“No, I don’t think so.” [prediction] Listens to the video. [Uses video to help meaning] “It wasn’t in the video but it was under the picture.” [evaluates importance of video and caption]

“Prisoners in the camp wore badges that identified their crime. I think that means the triangles [infers] because above that caption is the triangles.” (Lets out a heavy sigh)

Erin: “This was contrary to Nazi thinking that all people should give up their individual rights and serve the Fuhrer. I am pretty sure Fuhrer is like a title that Hitler gave.”

[prediction] Erin uses the dictionary feature to look up Fuhrer and checks her prediction.
"I am going to start the sentence over." [rereads for meaning]

"They could have left the camps had they renounced [rereads to understand word renounced] their faith, but most did not, preferring instead to meet, pray, and attempt to convert others. While there was no official plan to eliminate them, maltreatment. . ."

"I am going to look up maltreatment because I am not really sure what that means.
[dictionary feature] I am going to read the example." [definition, reads example to make meaning because the definition left gaps in meaning].

"Homosexual males were another target, as the Nazis believed them too effeminate [struggles to sound out] to serve in the military. It was considered the duty of good Aryan"

"I am going to look up Aryan word because it's blue [hyperlink & text book feature] and I don't know what it means."

No Post Reading Strategies Identified

Further evaluation of Erin's pre-interview and post-interview revealed that vocabulary knowledge was very important to her, and she displayed a strong indicator of word consciousness. Erin demonstrated that she was very aware of the impact of vocabulary on reading comprehension in her post-interview, and she was truly interested in word meaning as evidenced by her comments and behaviors in both her pre-interview and post-interview.

Research Sub-question2: What role did the iPad features play in the reading process as Erin read nonfiction text using the iPad.

Erin used several features of the iPad to support her understanding of the nonfiction text read. Her features often were text dependent as each text offered different feature options. Often *The Shoah: 101 Keys to Understanding the Holocaust* was used to help support what was going on in *Anne Frank and the Children of the Holocaust*, but the features were often very different. In *The Shoah*, there was a high use of hyperlinks, and in the text of *Anne Frank* there was a high use of highlight and search. Both texts had an abundance of content-related vocabulary as well as German terms. Erin always used the hyperlinks in *The Shoah* to look up not only the definition but also examples and pronunciation of the vocabulary word as shown in the following quotation: “I don't know what that means so I will define it. . . . I am going to read the example; it is right underneath the definition; it is in italics. I am going to see how it is pronounced. I am going to reread that sentence.”

She often read the definition, example, and pronunciation as indicated in several of her think alouds to support her understanding of the text. Erin relied heavily on iPad features to support her understanding. She stated in her post-interview that the dictionary feature supported her when she stumbled on “hard words.” She also stated that she relied on the search feature to help her narrow down her search when looking for something specific. Highlighting was a relatively new strategy for Erin yet she began highlighting from the beginning of the study. She often used multicolored highlighting for specific items. In her post interview, she commented, “I really like the highlighting. It just made

my life so much easier.” She further explained her rationale for highlighting and her use of multicolored highlighting:

. . . for example I used yellow for dates and green for any specific information that happened to Anne Frank and sometimes blue for any definitions. It makes it more what’s the word. . . intelligent. The blue, I really like using those words; it just helps build my vocabulary.

In summary, Erin moved seamlessly from text to text, text to dictionary, or text to Internet using multi-finger gestures and hyperlinks. She adjusted the font to compensate for her vision issues [usually wears glasses]. In addition, Erin adjusted the background to nighttime setting so the text would “pop out.”

Case Study Descriptive Data for Jerry (Student 3)

Primary Research Question: How did Jerry read nonfiction text using the iPad?

Jerry had high reading comprehension, a medium MARSİ score, and low prior iPad use. Jerry was a strategic reader who ranked third in his class based on his Lexile scores of 1255. Jerry scored above the average level of 805-1100 compared to his classmates. His teacher commented that he had seen a “remarkable change” in that Jerry’s motivation had improved during the current year. Though ranking at a medium level on the MARSİ, Jerry was very strong in conveying his thoughts as he participated in the think alouds. Retrospective think alouds produced strong reasoning as to why he used the strategies and or features of the iPad to support his learning. He was quick to

implement a think aloud when meaning was breaking down and voiced fix-up strategies. Jerry was by far the most vocal participant in the study. He scored highest in the area of problem solving strategies on the MARSII and “usually” used visualization, analysis, and evaluation of information being read, as well as rereading, asking himself questions and underlining or circling information. He reported that “occasionally” he discussed the text with others, previewed text, read aloud, and adjusted his rate. The area that changed the most for him was “discuss what I read with others.” He stated in his post-interview: “I wish we could do that all the time [group discussions]. I love the discussions. It [the discussions] helps me so much more” [understanding the text].

In his iPad survey, Jerry stated that he used an iPad at home “occasionally.” He stated that he “sometimes” used the iPad to connect with friends on social media such as Facebook. He also “usually” listened to music, and “always or almost always” played games on the iPad.

He revealed in his pre-interview that he had a cousin with an iPad who lived nearby. He said he spent about 30 minutes a few times a week on his cousin’s iPad and that his cousin had shown him how to “look” at the summaries on iBook. He said that he had read many of the summaries on the iBook website and that his favorite book to preview was *Goosebumps*. He also stated, “I am not usually into reading that much, and I am usually into scary books and stuff, but that was like a biography and that was one of my favorite books.” When the researcher asked him why this was one of his favorite books, he said “Electronic, it is like more fluent to me. It’s easier because of the technology and stuff. With print books, I kind of get bored. This is a “funner” way to

read the books.” The researcher asked him to expand on what he meant by fluid, and he stated, “Like it’s kind of easier to read, like you can even change the size of it, and you get through it smoother.”

In reviewing the transcripts of Jerry’s think alouds and observations, two themes emerged: peer assist and features. Jerry showed evidence of both themes including many subthemes for features. He had only one incident in which he offered peer assistance to another student. Anna could not find where the other students were as they were reading. Therefore, Jerry showed her that if she used the same size font it would be easier to locate where other students are reading. “See if you make it as small as you can and then go one size bigger, we will all be on the same spot.” [Jerry takes over and changes Anna’s font size].

Jerry also had several incidents in which he displayed feature use to support his reading. Table 16 display’s the nonfiction and iPad features used by Jerry in his reading.

Jerry believed it was easier for him to read on the iPad. He believed the features of the iPad and the nonfiction text features supported his understanding of the text.

I actually read it differently because it was much easier for me. I could read it more at once because like I didn’t have to worry about forgetting something, because I could write it down on the notes [sticky notes] immediately. I don’t have to waste time getting paper and pencil to write my notes. You can just click a note and keep on reading. So, I got through the book faster. When I needed to go back, like for my recording [video book report], I put notes down so all I have to do is go to my notes now.

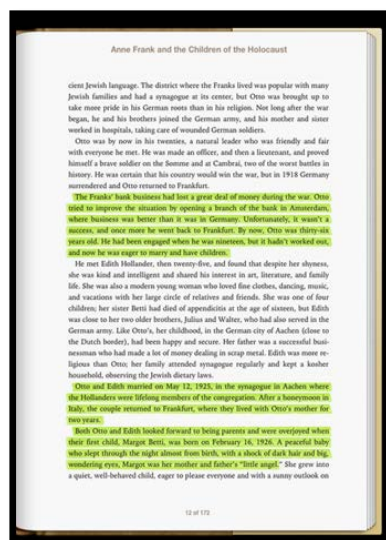
Table 16

Nonfiction and iPad Features Used by Jerry

Features	Indicators
Nonfiction	
Audio	5
Caption	4
Chapter headings	5
Context clues	19
Glossary/ definitions	2
Pronunciation	16
Subchapters	2
Video	11
iPad	
Book marking	2
Highlighting	4
Hyperlink	7
Multi-finger function	Observation
Outside resources	3
Search feature (web)	7
Search feature (text)	7
Social sharing	1
Sticky note	10

Jerry read both books differently. In the text, *Anne Frank and the Children of the Holocaust*, Jerry used highlighting freely. He began highlighting large sections of information that he thought would be important to his understanding. Jerry was often observed watching others and their purpose for highlighting. As he continued to explore this feature throughout the study, he began to refine his highlighting. By the end of the text, he used the highlighting feature for specific vocabulary words needed to support his understanding. Figure 7 shows Jerry's initial broad use of highlighting and his subsequent refinement of the strategy.

Panel 1: Highlighting



Pane 2: Highlighting

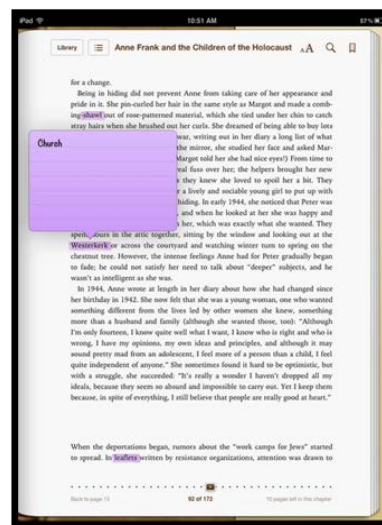


Figure 7. Examples of Jerry's Use of the iPad Highlighting Feature

Jerry was one of the first students to search for information outside of the iBook. He would often use the multi-tasking gestures on the iPad and could be observed moving through multiple screens at a given time. “With this, all I have to do [gestures multi finger touch] is, I just slide the screen over and go to the Internet and then back to the book.”

Jerry often discussed through his think alouds the evaluation of websites and how he should focus on .org or .edu websites. He also used the Yahoo website to seek information from others as noted in the following think aloud:

“Oh isn’t that how he wanted everyone to have blonde hair and blue eyes, but the people who didn’t have it would he let them live? Yet, he didn’t have blonde hair and blue eyes.”

The researcher asked him what he could do to find the answer to his question, and he replied,

I remember going back [goes back to the table of contents and looks at the main ideas listed under each chapter] sometimes; you can go to a web search to click it.

You can go to *Wikipedia*. From *Wikipedia* I can go straight to Google. [goes to Google and types in his question]

The researcher asked him why he didn't use *Wikipedia*, and he stated, "Because people can go on Wikipedia and change stuff so you don't know if it is always true." [Types in search bar: Why did Hitler only want people with blonde hair if his hair was different?] After being asked to discuss what he was doing retrospectively, he stated, "Okay, I went to Yahoo because Yahoo has different things people say. Because Yahoo has many different stuff." The researcher asked him to clarify what he meant by stuff, "Do you mean perspectives, comments, and blogs. . . different what?" Jerry responded, "They have questions that people ask and other people comment. Like you can post a question and other people answer it." [Reads the Q & A posted on Yahoo].

In the text, *Anne Frank and the Children of the Holocaust*, Jerry relied on context clues, something that he frequently used in print-based reading. Jerry believed that this strategy evolved for him. Though he still used context clues in this text, the features of the iPad allowed him to move just beyond what he thought the text meant. He combined multiple strategies to support his learning. For example, the following think aloud shows how he combined context clues, prediction, evaluation, confirming his prediction, and visualization.

I use context clues a lot in print but in this, I used it differently, because I used context clues, but then I can go to the Internet to see if I was correct. I used visualization also because it allows me to see what they mean.

Jerry also read *The Shoah: 101 Keys to Understanding the Holocaust* differently. He said he used the two texts to gain a different perspective of the information he was reading. Jerry interacted with the text to develop intertextuality. He explained in the following think aloud:

I read that one more, not like a book but like facts, I read what I thought would be more important. Like I didn't go through and read the whole book, I read parts of it. I would read *Anne Frank* and if I wanted to know more about that I would go to *The Shoah* and look in the index and there would be different facts so I would click on that and it would take me there.

Researcher: "Could you give me an example of a fact that you looked up?"

It was about Hitler how he was being to the Jews and I wanted to know how all of this happened so I went to the Rising of Hitler [in *The Shoah*], and I read that and it talked about how it was before the Jews, and then it talked about what happened after the Jews.

Jerry used previewing of text differently. He stated in his post-interview that this was one strategy he had used more since beginning his participation in the study. When asked how he previewed the digital text, he explained: ". . . I'll go to the videos and listen to what they are about. This helps me to know what the book is about."

Jerry read nonfiction text on the iPad differently, using both nonfiction and iPad features to support his learning. As he stated it, “Every day I liked being able to come into the class and do something new instead of reading out of books like I have done in my school years.”

The following sub-questions provide further examples of strategies and features used to support Jerry’s reading of nonfiction text using the iPad.

Research Sub-question 1: What reading strategies did Jerry use to read nonfiction text using the iPad?

In reviewing Jerry’s MARS survey, several sections indicated that he had a strong foundation in regard to print based strategy use. Jerry indicated on several questions on the MARS that he “usually or sometimes” used a wide array of strategies when he read print-based text, e.g., underlining and circling information in the text, stopping from time to time to think about what he read, and rereading. These same strategies transferred smoothly into his reading of nonfiction text using the iPad. One strategy that changed for Jerry was previewing vocabulary that he may not have known. In his pre-interview, he stated that he usually looked for words he did not know. This strategy was significantly different for Jerry when he read nonfiction text using the iPad. Jerry often used the glossary, dictionary feature, or outside resources to support his vocabulary development. Jerry often engaged in multiple strategies during reading. While reading *The Shoal: 101 Keys to Understanding the Holocaust*, Jerry monitored his

understanding of the text and often used self-regulated fix-up strategies to support his understanding of the text as noted in Table 17.

Table 17

Examples of Jerry's Before, During, and Post Reading Strategies

Text: *The Shoah: 101 Keys to Understanding the Holocaust*

No Before Reading Strategy Identified

During Reading Strategies

Jerry [reading] "Jehovah's Witnesses refused to serve in the military. This was contrary to Nazi thinking that all people should give up their individual rights and serve the Fuhrer." Jerry stumbles on the word, Fuhrer. [uses highlighted word and hyperlinks to the glossary, reads definition, and uses the pronunciation key].

"While there was no official plan to eliminate them, maltreatment, starvation, and disease claimed the lives of as many as half of the Jehovah's Witnesses that were incarcerated."

"I think I know what that means [prediction] so I am going to look it up to check." Jerry uses context clues to make sense of the word. "Malnutrition is where they don't feed you good food, so that is what I thought, I'll check my prediction." [uses highlighted word and hyperlinks to the glossary, definition, and pronunciation key] "Like I know that on the news there is malnourishment which means the parents were bad to them like cruel to them and when they did feed him they feed him like spaghetti noodles hard and that was all he could eat." [text to real world connections] Reads the definition. "Wow that's bad" [evaluation and reflection].

When the researcher asked him why he felt that was bad, he stated, "Just because they didn't want to serve they would just kill them because maybe some people wanted to stay with like their families." [evaluation and analysis]

"Homosexual males were another target, as the Nazis believed them too effeminate. . . ." "I don't know what that means." Looks it up, reads the definition. [uses highlighted word and hyperlinks to the glossary, definition, and pronunciation key] He rereads silently [silent reading] to put it together to make sense of what the definition said.

He rereads the entire sentence. [rereads] “Isn’t that like when they say females are feminine? [text connections] “I wonder if it is like that?” [prediction] Jerry looks up using definition this time, reads the definition and proclaims he was right to make feminine! [uses highlighted word and hyperlinks to the glossary, definition, and pronunciation key, confirms prediction]

“. . . to serve in the military. It was considered the duty of good “Aryan” men to produce children, something homosexual men were not likely to do unless they were ‘cured.’” Looks up Aryan, reads definition in the glossary. [uses highlighted word and hyperlinks to the glossary, definition, and pronunciation key] Reads and states, “I know what that is, the aboriginally group.

Rereads and stumbles on ‘cured,’ states he does not know whether it is c/u/red or cu/r/d, states he knew cured is used in cows, [text connection], looks it up to determine the meaning, [uses highlighted word and hyperlinks to the glossary and definition].

“Between 1933 and 1945, approximately 100,000 men were arrested on suspicion of being homosexual. ‘Wow they just did it because they thought they were. . . they didn’t even know.’ [reflection]. About half were sentenced to serve time in prisons, and another 10,000 spent time in concentration camps. Experiments were done on these men in an effort to ‘cure’ homosexuality, but no scientific knowledge was ever gained from these efforts. The number that died in the camps is not known. Non-German homosexuals were not persecuted, nor were female homosexuals. ‘I wonder why they didn’t bother the females, [reflection and questioning] maybe it is because they didn’t want the females in the war; they only wanted the men [infers]. They just did it to the men.’”

“Homosexuals, Jehovah’s Witnesses and political prisoners were not sent to camps to be concentrated and murdered. Rather, Nazi officials wanted to punish them and to coerce. . . .” ‘Coerce, I am going to look this up to see how to pronounce this,’ [reads definition after looking at the pronunciation key] [Uses highlighted word and hyperlinks to the glossary, definition, and pronunciation key].

“Can I look at the video? Because whenever I am looking at a book I usually look at the pictures and read what’s under it to help my understanding.” [text connections]. Reads the caption first, then listens to video [text features]. “The video shows a person on crutches. Do you think they make them fight? No, it looks like they are just trying to show how many people they have” [infers and evaluates]. “Like that’s not even the whole picture. Part of it is cut off. Wow!” [analysis].

Researcher: “How did this picture help your understanding?”

“It also like showed me how many people were in the war, how did they get everybody out. It must of like took a long time, because there are so many people in the picture.” [evaluation, analysis, and synthesis]

No Post Reading Strategies Identified

In his pre-interview, Jerry stated, “I just read.” He also noted that he often “. . . just opens [the book] and looks at chapters, or looks at the back of the book for the summary.” Evaluation of his think aloud illustrated the depth of Jerry’s strategy use while reading nonfiction text using the iPad. Jerry’s frequencies of use of reading comprehension strategies are shown in Table 18.

Table 18

Frequencies: Jerry's Reading Comprehension Strategies

Reading Comprehension Strategies	Frequency
Audio	5
Connections	11
Context clues	16
Determine importance	3
Evaluation	23
Highlighting key vocabulary	2
Hyperlink	0
Infer	6
Monitoring of meaning	0
Prediction	5
Pronunciation of key vocabulary terms	16
Reflection	5
Rereads	16
Synthesis	4
Video	11
Vocabulary Definition	0
Vocabulary pronunciation	0

Jerry was asked to reflect on his strategy use during his post-interview survey. In his reflection, he indicated that he believed he read differently using the iPad and that his strategy use changed as well.

. . . I would go through it slower, because it would be much harder for me [print text]. But, with this I can go through it faster. When I, like, get off the book, I have to go to a dictionary or the Internet. With this, all I have to do [gestures multi finger touch] I just slide the screen over and go to the Internet and then back to the book. I use context clues a lot in print, but in this I used it differently

because I used context clues; but then I can go to the Internet to see if I was correct. I used visualization also because it allows me to see what they mean.

Jerry often relied on the definition and example feature of the text on the iPad. He believed this feature helped to relate what he was reading to “real stuff.” The examples embedded in the definition showed how the word was used, and this allowed him to visualize what was going on in this section of the text. Jerry displayed many before, during, and after strategies throughout his think alouds. Previewing the text looked a little different for Jerry as he no longer just opened the book and looked at the chapters. While reading nonfiction text using the iPad, Jerry often previewed the text by reviewing video and audio. He believed this helped him relate better to what the book would be about. The greatest change in strategy use for Jerry was in discussions with his peers. This strategy became the one strategy that he relied upon the most. He believed that the discussions helped him better understand the text and his peers’ perspectives of the text: “. . . but what I liked most was using the groups, I liked that the most. It helped me knowing what my friends thought about the text compared to what I think, too.”

Research Sub-question 2: What role did the iPad features play in the reading process as Jerry read nonfiction text using the iPad.

Jerry used several features of the iPad to support his understanding of nonfiction text. He often used the definition feature and examples to support his visualization of the text. Highlighting and note taking evolved as Jerry became more proficient with the application. In the beginning of the study, Jerry simply highlighted large chunks of text.

As he became more proficient with the application, he began to selectively highlight, using multiple colors for various texts. He stated, “When I got to a word, I did not know, I used purple highlighting for words I did not know. I noticed it makes it a lot easier, like I can go back and look at what I need.”

Jerry also used the videos frequently to understand and preview the text he was reading, combining both nonfiction features as well as iPad features to support his reading. Jerry believed the features of the device made reading on the iPad more “fluid.” He believed that the iPad made it easier for him to find things. He often used the search feature to look for specific information in *The Shoah: 101 Keys to Understanding the Holocaust* as he was reading the text, *Anne Frank and the Children of the Holocaust*, and moved seamlessly from text to text, text to dictionary, or text to Internet using multi-finger gestures and hyperlinks.

Case Study Descriptive Data for Trey (Student 4)

Primary Research Question: How did Trey read nonfiction text using the iPad?

Trey was a strategic reader who ranked fifth in his class in regard to Lexile score. His current Lexile Level was 1160, just slightly above the grade level expectation of 805-1100. Trey ranked very high on the MARSI, and his highest sub area was problem-solving strategies. Trey indicated that he “always or almost always” tried to get back on track when meaning broke down. He also paid close attention to difficult text, stopping from time to time to think about what he was reading. He visualized what he was reading

and reread when needed. He displayed good strategy use in print-based reading. When looking more closely at his MARSII scores, it was interesting to note that he “never or almost never” read aloud when the text was difficult or skimmed the text, noting length and organization. In reviewing his pre-interview and post-interview transcripts, the researcher noted that he reported several times that he often read a few sentences in the first chapter then immediately went to the last page of the text to read the conclusion. When asked why he did this, he indicated he was evaluating the text.

Trey’s iPad survey indicated that he had no prior knowledge of the iPad, and he responded “never or almost never” to 11 of 16 items on the iPad survey. After careful review of the iPad survey and his pre-interview, it is important to note that Trey had confidence in his ability to use the iPad as he responded that he “always or almost always” found what he was looking for on the iPad. He also indicated the he “occasionally” searched for information on the iPad. In observing Trey throughout the study, this was his strongest area. He was very proficient in assisting others or locating information within the text or outside of the text using the Google search engine.

Trey was very confident and highly engaged in the think aloud process, often-offering extended explanation retrospectively as to why he would use a specific strategy. He often explored the multiple features of the iPad and was the first student in the group to move all of the apps on the screen into specific folders according to his preference.

In reviewing the transcripts from his think alouds, two themes emerged: peer assistance and features. Trey showed evidence of both themes including subthemes for features. He had 10 instances in which he offered peer assistance to other students as

evident in the following think aloud: “This is how you screen shot. You hold the on/off button and the home button and you screen shot, and then it goes right into your photos.” Trey also explained to his peers how to split the keyboard. “Click on the little keyboard symbol, and hold it until you see the word split, once you see that click on split.” Figure 8 provides a visual for both types of peer assistance Trey provided: the screen shot and split keyboard.

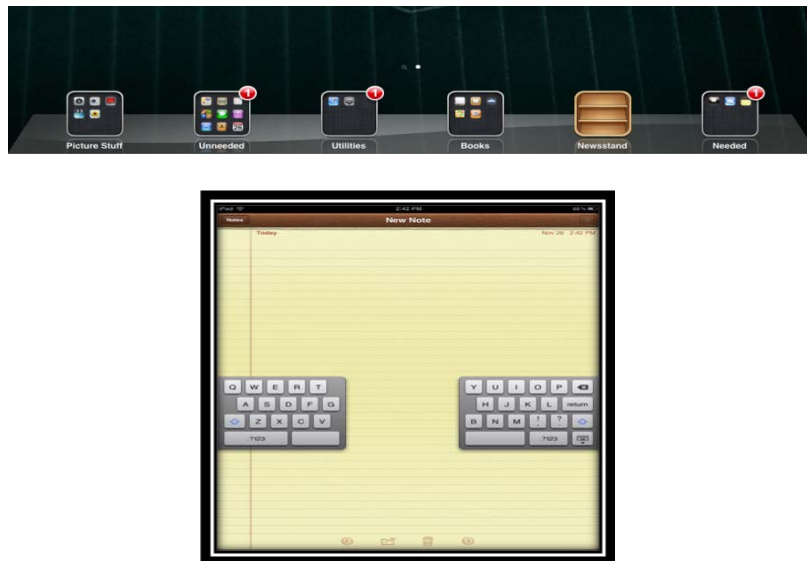


Figure 8 Visuals of Screen Shot and Split Keyboard

Trey often offered peer assistance, and students frequently requested his assistance as he was very strong in explaining what to do as evident in the following think aloud:

Anna often struggled with sounding out words. During a read aloud session, Anna stumbled with the word, deportation. Trey told her what it was and she repeated it

back to him. Trey showed Anna how to highlight and search for the definition and pronunciation of the word she was having difficulty with. Anna sounded out deportation, using the pronunciation guide successfully. This was the first time Anna was successful with an unknown vocabulary word in which she simply did not say blah, blah, blah or that word.

Trey offered peer assistance on numerous occasions. For example, Erin was trying to pronounce Branau. She clicked on the define button:

Ugh. . . I am on Wikipedia, but I don't think I want that website. . . . Trey, can you help me? How do I see the pronunciation of this? I was trying to see the pronunciation of the city, but it failed. I could search it but. . . . Trey, what can I do?

Trey also had multiple incidences of feature use. Table 19 displays the nonfiction and iPad Features used by Trey.

Table 19

Nonfiction and iPad Features Used by Trey

Features	Indicators
Nonfiction	
Context clues	6
Definition/Glossary	19
Examples	1
Pronunciation	3
Video	8
iPad	
Font Size	Observation
Highlighting	14
Hyperlinks	5
Key board manipulation	Observation
Multi-gesture feature	Observation
Night time setting	Observation
Screen capture	Observation
Search	10
Sticky notes	3

Trey believed it was easier to read on the iPad and that the iPad supported his learning by giving him the tools he needed for word recognition and pronunciation:

It was much easier because I look things up and pronounce words better. I will always mispronounce a word or say a name wrong, but I can look up. [on the iPad] They will most likely have that thing that shows it spaced out and how it is pronounced [pronunciation key].

After reviewing his pre-interview and post-interview transcripts there were several comments on the usefulness of the dictionary feature, pronunciation guide, and sticky notes. Trey read both books differently. In the text, *Anne Frank and the Children of the Holocaust*, he believed he read it as he would have read a print book. He tried to

use strategies that he frequently used when he read print-based text such as sounding out unknown words. When asked how he read *The Shoah: 101 Keys to the Holocaust*, he said he believed he began reading it like a normal book but realized the features of the text could help him in his understanding. Trey was asked if the iPad affected his reading and he stated, “Yes,” but his reasons were surprising:

Researcher: “You said it was easier, why do you think it was easier?”

Trey: The lighting, I do not like when shadows get in the way because the shadows are distracting. I have a very short attention span. The shadows when I am reading, the shadows will move and stuff, and they will distract me because I will look at them and then I lose where I am at. The lighting will stop the shadows, and the pages will not flip and create their own shadow. I like reading in the dark.

Trey further explained in one of his think alouds how the iPad could support his brother’s learning because his brother has vision issues “I do not adjust the font but I think my brother would have to, because he has a seeing disability. He would make it much larger; he is a couple of registers away from being blind.”

In an interview, the classroom teacher offered the following observation: “Trey is a very capable student but often works at a snail’s pace unless you put a fire under him.”

Trey worked very hard throughout the study, often finishing his work early and completing the reading assignments within the time allotted. The iPad was a motivational tool for Trey that allowed him to control some of the distracters that he

would normally encounter. In Trey's words, "I like the iPad and I like reading on the iPad. I am more motivated to read on the iPad."

The following sub-questions provide additional information as to strategies and features that supported Trey's reading of nonfiction text using the iPad.

Research Sub-question 1: What reading strategies did Trey use to read nonfiction text using the iPad?

In reviewing Trey's MARSI inventory, use for print-based strategies was relatively high. There were only a few indicators that fell within the "occasional to never" column. Problem solving strategies showed the highest score, indicating that he was a strategic print-based reader with multiple strategies. Reviewing Trey's think aloud transcripts revealed that he engaged in many before, during, and after reading strategies as he read nonfiction text using the iPad. These strategies are presented in Table 20.

Table 20

Examples of Trey's Before, During, and Post Reading Strategies

Text: *The Shoah: 101 Keys to Understanding the Holocaust*

Before Reading Strategies:

“First, I am going to look at the video because this kind of interests me. It is a pile of ash with a whole bunch of people saluting the Nazis [uses video to support purpose for reading device feature, keeps the video small to listen]. All right and now, I am going to read.”

During Reading Strategies:

Trey, reading: “In an attempt to purify the culture, the Nazi German Student Association, some of their professors, and Nazi Party officials spent about a month removing books deemed. . . I messed up on that.” [continues reading, determines meaning is breaking down].

“. . . to be “un-German” from university libraries and bookstores in about 20 cities around the country. Books targeted for incineration. . . Adolf Hitler needed the support of military commanders if he was to become President when the ailing Paul von Hindenburg died, and killing the top leaders of the SA.”

“I don’t know what the SA is” [student uses the define mode, and follows up with a search using the find function].

Peer Assist: “... it tells you how many times you can find it in the text, where you can find it in the media. It will tell you the glossary term and how it is used” [glossary text feature-device feature]. “When you are done press done on the top to get back to the text” [device features]

Listens to the video [text specific feature, device feature]

After Reading Strategies:

[discussion] “Hitler was a homosexual.” Listens to the video for a second time [device feature] “Earnest was gay? Wait, why did Hitler want to kill homosexuals if his friend was gay?” [questioning, determining importance, evaluation, discussion]? “Because they thought, they were impure and not perfect” [discussion]. “He actually wanted people with blue eyes and brown hair. He killed all Jews.”

As shown in Table 21, Trey used several reading comprehension strategies. He often self-regulated his use of strategies, and he applied fix-up strategies to repair meaning. Trey offered peer assistance on numerous occasions for multiple students. He often scrolled through the table of contents looking for information. He pinned the table of contents to the bottom of the screen in vertical mode for the text *The Shoah: 101 Keys to Understanding the Holocaust*. When asked to explain why he was scrolling through the text, he stated, “It seems easier, more efficient, than reading and skimming through the chapters.” Trey used the study questions at the end of *The Shoah* as well, and it was noted in an observation that Trey often previewed the questions first, then scrolled through the text looking for highlighted words. He explained to the researcher that he noticed that most of the answers were highlighted, so he realized that he could just skim the text until he reached a highlighted word. Then he would slow down and read more carefully looking for specific details to support his response. He would then use the multi finger gesture to scroll back to the questions to see if his choice was one of the answers he was looking for. If not he would continue searching.

Table 21

Frequencies: Trey's Reading Comprehension Strategies

Reading Comprehension Strategies	Frequency
Audio	0
Connections	0
Context clues	0
Determine importance	0
Evaluation	0
Infer	0
Highlighting	4
Hyperlinks	9
Monitoring of meaning	0
Prediction	0
Reflection	0
Rereads	0
Synthesis	0
Vocabulary Definition	4
Vocabulary pronunciation	0

Trey read both books differently. Though he began reading them both as he ordinarily would read a print-based book, he explained what changed his approach:

In a regular textbook, I would not be able to just move my finger over and just find where I need to go to. I could highlight; I could link to mini chapters in the book; I could go to the smaller chapters [subchapters]. I couldn't do that in a regular textbook. I was able to use *The Shoah* to help me with information. The only reason I really knew what was going on in *Anne Frank*, because they were talking about harvesting the bodies, the only reason I knew about that was because I read *The Shoah*.

Trey interacted with the text to develop intertextuality. The researcher asked Trey to clarify what he read that supported his reading. He shared that chapters of *The Shoah: 101 Keys to Understanding the Holocaust* aligned with what he was reading in *Anne Frank and the Children of the Holocaust*. The harvesting of the bodies meant: “It was shoes and hair and they said that they used a picking process to tell whether they were healthy or not. And then they took the shoes, hair jewelry, everything from them.”

Research Sub-question 2: What role did the iPad features play in the reading process as Trey read nonfiction text using the iPad.

Trey believed the features of the device helped him to support his understanding of the text as evidenced in the following think alouds “. . . whenever I read I highlight in certain colors. When I stop at a word, I highlight that in a certain color and then important parts of the story in another color so I color code.” Trey also discussed the ease of finding vocabulary within the text:

. . . it tells you how many times you can find it in the text, where you can find it in the media. It will tell you the glossary term and how it is used. When you are done press done on the top to get back to the text.

Trey believed the text examples supported his reading and compared print examples to digital examples:

. . . like the normal textbook you can read examples but there are not that many, but in this you can go straight to the Internet and look up what you need. Like sometimes in the math book they have definitions of words, but like it’s usually

small and you might not get what it means, and so like on this you can click and search in the dictionary...

Trey often highlighted text, placing color coded sticky notes on key vocabulary terms or important information. In one instance, Trey was observed posting numbers on the sticky notes. When asked why he was putting numbers on his sticky notes in addition to color-coding them, he stated that he was doing this because he was marking the questions he was attempting to answer. He further explained that when he was finished he would review all his 1s and synthesize what the answer would be for the first question. Trey was observed flipping in both directions of the text looking for information to support the end of section questions in *The Shoah: 101 Keys to Understanding the Holocaust*. Trey was often observed moving seamlessly between: text-to-text, text to Internet and text to notepad using multi finger gestures. Trey used multiple texts to support his understanding, often cross-referencing content using the search feature.

Case Study Descriptive Data for Anna (Student 5)

Primary Research Question: How did Anna read nonfiction text using the iPad?

Anna had average reading comprehension, a medium level MARSI score, and low prior use of an iPad. She was a reader who ranked seventh in her class in regard to Lexile testing, scoring 1060, well within range of the class composite of 805-1100. Her highest area of strength on her MARSI score was in the area of problem solving strategies. Her highest indices stated that she “always or almost always” tried to get back on track when

she lost her concentration, and this was one of her most problematic areas. She was frequently off task and often lost her place when reading. Her teacher commented that Anna was usually distracted or distracting others. She also scored high in stopping to think about what she read. However, in her think alouds she often voiced concern with having to stop.

During a think aloud session, Anna came to the word, Yiddish. She attempted to sound it out, said “whatever” and continued reading. She omitted the word, Yiddish, and just said “that word.” In a retrospective discussion, the researcher reminded Anna that she had encountered a word that she did not know in her reading. When the researcher asked her to reflect on her strategy use, Anna stated that she “sounded it out.” The researcher asked, “Was that successful?” Anna’s reply was “No.” Anna was aware of meaning breaking down but was unsure of what to do to apply fix-up strategies. After further probing, the researcher asked, “So, then what did you do?” Anna proclaimed that she would just skip an unknown word. When asked if that was usually successful for her, she indicated it was not.

Trey offered Anna peer assistance. He helped her highlight, search for, and define the troublesome word. When asked if she would use the strategies modeled by Trey, she answered nervously, “Yes, but isn't that annoying, having to stop everything?” Trey discussed the importance of stopping to clarify vocabulary. The researcher asked Anna, “Why do you think it is annoying?” Anna explained, “Because I have to stop reading, then I forget what I read.”

Anna scored “never or almost never” for several areas on the MARSI: taking notes, previewing the text, underlining or circling information, and critically evaluating the text read. On her iPad survey, Anna responded “never or almost never” to 12 of the 16 items listed on the survey. Further evaluation of her pre-interview revealed that Anna had an iPod touch, her brother had a tablet, and her mother had a Nook. She stated that she used her brother’s tablet to go on Facebook and listen to music. In her pre-interview, she said she liked reading on the computer, stating: “. . . anything I read on the computer seems easier, like I read it faster, I don’t know why. Reading on the computer makes time go faster.”

Anna was a cautious but eager participant in the think alouds. She often expressed excitement about the use of technology and felt that students would read more because the iPad was cool. Anna was somewhat reluctant to use features of the device and was often very apprehensive to change anything on the iPad. A good example was her hesitance to change her screen orientation. Through observation, it was noted that Anna’s screen orientation was in night feature: black screen with white letters as shown in Figure 9. In her post interview, when asked if she adjusted the font or screen layout in any way while she was reading, she replied, “No, I have no idea how that happened.” When asked if she would like to change it, she stated, “No, it doesn’t matter.”



Figure 9. A Visual of Anna's Night-time Screen Orientation

Reviewing the transcripts of Anna’s think alouds and observations, two themes emerged: peer assistance and features. Anna showed evidence of both themes including many subthemes for features. She had multiple incidents in which she requested peer assistance or offered peer assistance. Anna often attempted to sound out words in the passage using decoding [not successfully] and would often ask her peers for help. “Joe, can you help me find out how to say this word?” to which Joe responded, “Sometimes you can highlight it and click on it, because sometimes it has how you can sound it out [pronunciation key].”

Anna had multiple incidences of feature use. The nonfiction and iPad features used by Anna are shown in Table 22.

Table 22

Nonfiction and iPad Features Used by Anna

Features	Indicators
Nonfiction	
Context clues	18
Dictionary	14
Pronunciation	14
iPad	
Highlighting	4
Hyperlink	9
Search feature (text)	8
Sticky note	2
Video/Audio	8

Anna found reading on the iPad to be confusing at times, and she often voiced frustration. She stated that the two texts were difficult to follow, and she often became lost in the text. She voiced confusion when asked about how she read *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012). “I don’t really know what that one was about because we switched so much--it really confused me.” When asked how she read the text, *Anne Frank and the Children of the Holocaust*, she said she often lost her concentration and preferred to listen to others read the text.

Yeah but I didn’t like reading by myself, I won’t like concentrate. Like when we individually read it, I won’t like concentrate, but when we were reading it together it was easier to concentrate and easier to understand. I liked when Mr. Hank would explain what was going on in the chapter.

Anna had a difficult time answering several of the post-interview questions and asked the researcher to repeat the question with some frequency. Even after the question was repeated or explained, answers were very vague, and Anna showed signs of frustration.

How did Anna read nonfiction text using the iPad? She relied on prior knowledge of vocabulary and context clues. She relied more heavily on nonfiction features than device features. At the very end of the study, she began to see the value in stopping to look up the pronunciation of words. She moved beyond the use of “blah, blah, blah” and “that word” and began to use features of the device to support her understanding of unknown words with features of the device, specifically hyperlinking and searching. The following sub-questions provide further discussion of strategies and features used by Anna in reading nonfiction text using the iPad.

Research Sub-question 1: What reading strategies did Anna use to read nonfiction text using the iPad?

In reviewing Anna’s MARSII inventory, she had a medium range for strategy use in print-based reading. She stated that she “always or almost always” engaged in strategies such as stopping from time to time to think about what she read as well as redirecting her focus. These two areas were the biggest concerns for Anna as she read both texts. She was often off task and frequently lost focus and needed redirection or clarification as to what was being read. Anna also indicated that she “never or almost never” underlined or circled important information, took notes, or previewed the text.

Anna was very apprehensive about stopping during her reading, because she feared loss of concentration. In reviewing Anna's think aloud transcripts, it was clear that she lacked self-monitoring, self-regulation, and fix-up strategies to support her understanding of nonfiction text while using the iPad. Anna often chose to skip words rather than use the device to support her understanding. She also showed frustration in comprehension when using the two books to support her learning. She preferred to have someone other than herself read aloud; she often got lost in the discussion and frequently just gave up.

Anna had a strong foundation in context clues as well as structural cues. Jerry stated that he was unsure of what the term "thwart" meant and Anna told him, "It means not supporting what they could do so they wanted it changed." Jerry asked how she knew that, and she stated that she used context clues. Jerry looked up the definition and confirmed that Anna was correct and that she accurately used context clues.

In another incident, Anna and Trey discussed the term, "pamphlet." They connected the term to "leaflet," discussing the similarities of the word. Anna had strength in context clues, but when this strategy failed to support her understanding, she lacked fix-up strategies. In reviewing her post interview, Anna was asked to reflect on her strategy use as follows:

Researcher: "Did you find yourself adjusting your strategies that you typically use to read a print book to help you when you did not understand what you were reading?" Anna could not understand the question and asked if it could be repeated. Even after repeating, restating, and clarifying, she still could not

understand what was being asked of her. She showed signs of frustration and ended all of her conversation with tone and attitude, saying, “I still don’t get it!”

The researcher observed her for a period of time, confirming that Anna seldom applied strategies successfully and often just read. Anna frequently stumbled on context-related terms and either skipped them or mumbled over them, continuing to read. Anna was firm in her belief that stopping to clarify or ask a question would interrupt her concentration and understanding. An example of Anna’s limited strategy use and her frustration is presented in Table 23.

When asked if she read the two texts the same or differently, she said that *The Shoah* confused her because of switching so many times from text to text. She did not see *The Shoah* as a resource. Anna’s frequent use of comprehension strategies is shown in Table 24. Unfortunately, her strategies were unsuccessful in supporting her understanding of the text.

Table 23

Examples of Anna's Before, During, and Post Reading Strategies

Text: *The Shoah: 101 Keys to Understanding the Holocaust*

No Before Reading Strategies Identified

During Reading Strategy:

Anna, reading: "They were then searched for hidden valuables and told which barracks." [struggles to say barracks]

Anna: "I could define this." [definition] [through observation, it was noted there was no hyperlink to click on] "I could use context clues" [context clues]. "It states to jeer loudly." [Anna struggles with multiple definitions, evaluation, and understanding the definition. There are multiple meanings and she is trying to evaluate which meaning she should use]

"It is probably the first one because it says accommodation or building." [Anna still cannot pronounce the word, does not see the pronunciation guide, uses a context clue because the sentence is focused on a building]

Anna: [showing signs of impatience, blows heavily after this process. "I think in my head, and it is hard for me to say it aloud."

No Post Reading Strategies Identified

Toward the latter part of the study, the researcher wrote in her field notes the following:

Anna was successful today in applying a strategy modeled by one of her peers

Anna got to the unknown word and instead of saying 'blah, blah, blah' or

"whatever," she sounds it out successfully, yea! She used the strategy taught by

peers successfully. Shortly following this encounter, Anna attempted to sound

out another word, she struggled and asked her peers for help. Jerry said, “Sometimes you could highlight it and click on it because sometimes it has how you can sound it out in the pronunciation key.” She is beginning to apply a few strategies successfully.

Table 24

Frequencies: Anna’s Reading Comprehension Strategies

Reading Comprehension Strategies	Frequency
Audio	0
Connections	4
Context clues	17
Determine importance	4
Evaluation	8
Highlighting	4
Hyperlink	9
Infer	0
Monitoring of meaning	0
Prediction	0
Reflection	1
Rereads	4
Synthesis	1
Vocabulary Definition	14
Vocabulary pronunciation	14

Research Sub-question 2: What role did the iPad features play in the reading process as Anna read nonfiction text using the iPad.

Toward the latter part of the study and through peer encouragement and support, Anna began to “dabble” in using some of the features to support her understanding. During one of the think aloud sessions, the group was struggling to all be on the same

page and Anna offered peer assistance based on previous schema of event. She offered, “We looked up the page yesterday, because I couldn’t find where we were. So, you can type the page number into the search function. I used the search function, and I typed in a keyword. . . ”

In another session, students were reading and taking notes, and Anna asked the researcher for notepaper, stating that she feels pressured when she has to write on the computer. She wrote everything on paper and then typed it in notepad on the iPad. Anna needed direct interaction and peer assistance with features of the device. She was often apprehensive and only tried the features after a lot of peer encouragement and support. She did use several of the features such as highlighting and dictionary, but it often took her several attempts before she was successful. Anna showed frustration easily and preferred to just read rather than interact with the device.

Case Study Descriptive Data for Joe (Student 6)

Primary Research Question: How did Joe read nonfiction text using the iPad?

Joe was a strategic reader who ranked second in his class based on his Lexile testing. His Lexile score was 1300, significantly above the level required for eighth graders (805-1100). He ranked within a medium range on the MARSI, which indicated that he had strategies in place when reading print-based material. Global reading strategy category was his highest subcategory on the MARSI with several strong indices for strategy use. He indicated that he “always or almost always” previewed the text before

reading, stopping from time to time to think about what he was reading and visualizing as he read. He indicated that he “never or almost never” adjusted his reading rate, discussed the text with others or underlined or circled the text to help with comprehension. He also indicated that he never used reference material such as a dictionary or guessed the meaning of unknown words or phrases. This area is one of the largest areas of growth for Joe, as he believed the features of the iPad helped to support the level of difficulty of the text

I used the dictionary feature and search feature to find chapters because I couldn’t just scroll and find them. I also used a lot of highlighting and hyperlinks for big important words and a lot of the German words. I also used sticky notes.

During a group session, it was observed that Joe was using sticky notes and the dictionary feature to support his listening of the text. When one student was reading aloud, Joe heard a word whose meaning was uncertain for him. He stopped, highlighted, defined, and wrote a note on the sticky note and then continued listening to the reading (see Figure 10). When asked retrospectively what he was doing during the reading, he stated:

Roger was reading, and I was not sure of the meaning of “cheekiness,” so I highlighted, looked up the definition, and then posted a sticky note. This helped me to understand what it meant. I can also go back to the sticky note later, and it will remind me that I had difficulty with this word.

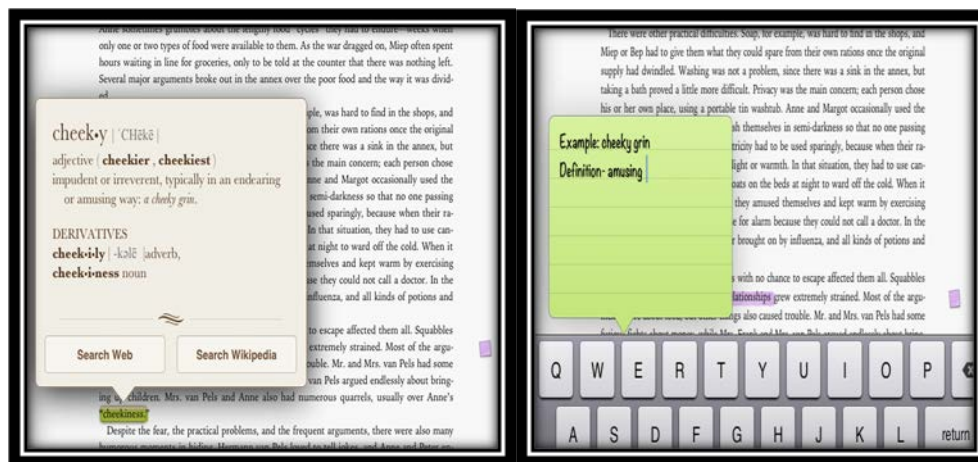


Figure 10. Dictionary Feature and Sticky Note.

Joe's iPad survey indicated that he "never or almost never" used an iPad to read, shop, or do school work. He did state that he "sometimes" used the iPad to play games, download music, and "occasionally" connected with friends on social networking such as Facebook. After previewing his pre-interview transcripts, it should be noted that Joe had an iPod and an iPhone. He defined the iPad as:

... pretty much a blown up iPhone. It has all different kinds of apps and you can read and pretty much do anything you want. You can go on the Internet, you can text people, you can read, you can play games. Pretty much anything you can think.

In reviewing the transcripts from his think alouds, two themes emerged: peer assistance and features. Joe showed evidence of both themes including subthemes for features. He had two instances in which he offered peer assistance to another student as evidenced in the following think aloud where Anna showed a lot of frustration during the

exercise with her statement, “I don't know where we are. . .” Joe explained that Anna was using a different screen layout and font size. Joe asked the group, “She can search a word using the search feature. What word should she type in?” Roger advised searching for PRINSENGRACHT using the search feature. Joe assisted Anna with typing in PRINSENGRACHT. . . and asked “What came up?” Anna replied, “A bunch of stuff, but I know we are in Chapter 7.” Anna hones in on Chapter 7 and locates PRINSENGRACHT.

Joe also had only a few incidences of nonfiction feature use but had multiple indicators of iPad feature use. The nonfiction and iPad features used by Joe are displayed in Table 25.

Joe explained in his post-interview how the iPad assisted him. He believed that the iPad helped him focus more and that the interactive features of the iPad helped to support his learning:

It was different because whenever you are reading a book you can stop and it gets boring; but like on the iPad if it gets boring, you can look things up or you can do other things in the book because it has pictures and videos. [*The Shoah*] I think I paid more attention to these features on the iPad than I would in the book. I focused a lot on the information that the author used to describe things because it didn't have a lot of pictures or videos [*Anne Frank*]. They were both for reading, but they weren't both the same.

Table 25

Nonfiction and iPad Features Used by Joe

Features	Indicators
Nonfiction	
Discussion of Nonfiction text features	Observation
Glossary	7
Pronunciation	3
Video	2
iPad	
Font size	Small
Highlighting	4
Hyperlink	3
Lighting	Bright
Screen Orientation	Horizontal
Search feature (text)	2
Sticky note	3
Vibrate (text)	Observation

Joe also discussed how the iPad can help support learning in the classroom and the value of having independence because of the device. When asked if he thought the iPad could support learning in the classroom, he stated that he believed students would retain the information longer because of the interaction with the device.

Umm... I think kids will pay attention more than just having a teacher up there because that gets boring. Like if you have the iPad, it's like right there. Like if the teacher is in the front of the classroom, you are just like listening and getting bored but if you have the iPad, all of the information is just there, right there on the iPad, so you can follow along with the teacher. It will stay in your head longer.

Joe reported reading differently on the iPad, although he believed many of the same print-based strategies supported his reading. He stated, “Yeah, it all kind of came in because either way you’re still reading and you’re still using a lot of the same strategies. I still slowed down when I didn’t know a word.”

He did feel that some of the strategies changed because of the support and interaction with the device itself. He shared the following example related to the pronunciation of words: “. . . in print, I usually sound it out, [words] but in the digital text it changed because I had the opportunity to highlight and search for how to sound out the word or define them.” Joe also believed that some of his strategies for reading changed: “I think I changed some of my strategies. I find myself slowing down more when I get to an unknown word; I notice I do this in other classes.”

Joe was an excellent candidate for think alouds and observations, but his absences, which often occurred on days the researcher was in the classroom, seemed to interfere with his reading. Although Joe had the second highest Lexile levels of all students in the classroom, he was the last student to finish the text and complete his video book report. Joe loved the feeling of independence because of the iPad and the features that he used to support his reading. The following sub-questions provide additional examples of Joe’s use of strategies reading nonfiction text using the iPad.

Research Sub-question 1: What reading strategies did Joe use to read nonfiction text using the iPad?

In reviewing Joe's MARSII inventory, he had a medium range for strategy use in print-based reading. Joe's strongest score was within the global reading strategies. This means he has strategies in place that include skimming, activation of prior knowledge and setting a purpose for reading. Strategy use was important for Joe and he often previewed the text to see what it was about prior to reading as well as stopping from time to time to think about what he had read or discuss with his peers. Throughout the study, and as shown in Table 26, Joe was observed using several strategies to support his understanding of the text such as rereading, determining importance and using support strategies: dictionary, glossary, and Internet. He read both books differently.

Table 26

Examples of Joe's Before, During, and Post Reading Strategies

Text: <i>The Shoah: 101 Keys to Understanding the Holocaust</i>
<u>No Before Reading Strategies Identified</u>
<u>During Reading Strategies:</u> "Hitler moved to Munich to evade arrest for not fulfilling his military obligation to the Habsburg Empire, the monarchy..." Sounded out unfamiliar word, 'monarchy' [highlighted, defined and created a post-it note] that ruled Austria at the time. Surviving on the fringe by sketching and painting watercolors, his life changed with the onset of the First World War. By all accounts. . ."
<u>Post Reading Strategy:</u> "Can I click on the video?" [Connects video to what he just read]

He believed *The Shoah: 101 Keys to Understanding the Holocaust* required a more focused approach to reading because there was information supported by video and audio features, whereas the text, *Anne Frank and the Children of the Holocaust*, did not have a lot of pictures or videos to support his understanding of the text. He also believed *The Shoah*. . . supported his reading of text *Anne Frank*. . . and that he used many of the same strategies that he would use if he were reading the same text in print. He stated that he still slowed down and adjusted his reading rate when the text became more difficult. However, the iPad changed that strategy slightly, as the iPad gave him the opportunity to highlight and define unknown words. He shared that he found himself slowing down and using these same resources to identify unknown words in other classes.

Research Sub-question 2: What role did the iPad features play in the reading process as Joe read nonfiction text using the iPad.

Joe used many of the features of the iPad to support his understanding of the text; he often used the videos to support his learning, making connections between the text and questions. He used the dictionary feature to understand unknown words when other students were reading aloud. After identifying the meaning, he would often use a sticky note and write a sentence/definition for the word. He often managed to accomplish this as others were reading and quickly caught up.

He believed the features made the text more interactive and thought that students would be more likely to retain the information because of the interaction. He also stated

that the level of the text complexity was difficult but believed that the iPad supported the level of difficulty. He summarized his experience of reading on the iPad as follows:

“[It] kind of changed my perspective. I never really liked reading, but the types of books we have been reading changed [that] and I kind of really like it a lot more. Next time I go to the library I will look for more Holocaust books.”

When asked what he liked best about this assignment he stated:

I liked the independence of it. Usually like when you are doing reports or stuff, you have a teacher in your face telling you what to do and that you are doing something wrong. This just allowed us to go off and do our own thing; we were able to work at our rate. I usually like working with a group, yet this made me feel like I worked more on my own, and I was more successful.

His statement is interesting, because the assignments were very interactive and required considerable group work. The independence he was talking about was the independence from the teacher. Mr. Hank became more of a facilitator during the class period rather than a lecturer.

Joe believed that the way he interacted with the device caused his strategies to change. He believed that the device features supported his level of understanding as well as the difficulty of the text. The iPad gave Joe a sense of independence of learning, which he enjoyed.

Case Study Descriptive Data for Roger (Student 7)

Primary Research Question: How did Roger read nonfiction text using the iPad?

Roger ranked fourth in the class based on his current Lexile Levels. His current score was 1195, just slightly above the level required for eighth-grade readers (805-1100). Roger scored within the medium level on the MARSII, indicating that he had strategies in place as he read print-based material. Problem solving was the highest subcategory for Roger with several indicators showing strong strategy use. He indicated on the MARSII that he “always or almost always” used the strategies of visualization, rereading, checking to make sure his guesses were right as well as staying focused and maintaining concentration. He scored 10 items on the survey as “never or almost never” having been performed. These items ranged from having a purpose while reading to thinking about what he read. Two of the 10 responses of “never or almost never” were in two areas in which he made a lot of growth during the study: discussion with others and using reference materials such as dictionary or typographical aids.

Roger’s iPad survey showed that he ranked in the low range for iPad use in that his response to 15 of the 16 survey items responses was “never or almost never.” The only response that generated a “usually” was related to his ability to find what he was looking for on the iPad. This showed a high level of confidence. Further evaluation of his pre-interview revealed that Roger has no prior knowledge or experience with an iPad.

In reviewing the transcripts from his think alouds, two themes emerged: peer assistance and features. Roger showed limited evidence of both themes including

subthemes for features. He had only one instance in which he offered peer assistance to another student, and he had very limited evidence of feature use. Roger's use of nonfiction and iPad features is presented in Table 27.

Table 27

Nonfiction and iPad Features Used by Roger

Features	Indicators
Nonfiction	
Audio	0
Context clues	2
Examples	0
Glossary /dictionary	12
Pronunciation	3
iPad	
Highlighting	1
Hyperlinks	1
Multi-gesture feature	Observation
Screen lock	Observation
Screen Orientation	Observation
Screen Saver	Observation
Search	0
Sticky notes	4

Roger was very quiet and did not offer much information during think alouds. He read smoothly, adjusting his reading rate when text became difficult but never vocalized what he was doing beyond slowing down or adjusting the rate. Roger was considered one of the most able students in the classroom based on teacher comments, but his absences were excessive in that he missed 16 consecutive days during a single quarter. His extended absences made it difficult to complete think alouds with him. The

researcher even extended the length of the study by a week to try to capture more data from him. His post-interview was cancelled three times due to absences. When Roger was asked how he read nonfiction text using the iPad, he responded, “I just kind of kept on reading. . . I didn’t use any features to help me.”

After reviewing his post-interview transcripts, Roger believed he read both texts the same way and that he would have reached the same outcome if he had been reading a print-based book. Roger was asked if the iPad affected his reading. Was it easier or more difficult? His response was, “It was harder, yet I think I would have gotten the same outcome.”

Roger believed it was harder to read on the iPad, because he read slower and because if he stayed on the page for an extended period, the screen saver came on. When asked if he could adjust the time of the screen saver, he just said “Yeah.” Roger was referring to the factory default that resulted in the iPad shutting down after nonuse. He was the only student in the class to have an issue with this iPad feature, a result of his letting the screen sit without interacting with it for extended periods of time.

Roger used minimal features (iPad and nonfiction) to support his reading. He used screen orientation to adjust the book to horizontal view and adjusted the font size. He indicated that did this because he read slowly. He also explained: “I adjust the font, make it larger, and I adjust the screen layout to horizontal because it felt more like an actual book.”

The following sub-questions provide further information regarding strategies and features Roger used to support his reading of nonfiction using the iPad.

Research Sub-question 1: What reading strategies did Roger use to read nonfiction text using the iPad?

In reviewing Roger's MARSII inventory, it was clear that he had strategies in place for print-based reading. However, Roger never verbalized what strategies he used during his think alouds. Only through retrospective think alouds could the researcher get a glimpse of his strategy use for reading nonfiction text using an iPad. In reviewing his MARSII, he "usually or almost always" used strategies such as monitoring his understanding of text, visualizing, and rereading. Looking over his observation transcripts, it was evident that Roger did adjust his reading rate when text became difficult. Roger was a strong reader with good comprehension: he often adjusted his reading rate or reread to check for understanding. Roger's before, during, and post reading strategies are presented in Table 28.

Roger missed a lot of school and often missed opportunities to participate in think alouds with the researcher. In pre-interview and post-interview, however, he stated that he just mainly visualized things in his head or if he was stuck on a word, he usually just skipped around it. The researcher's review of observations notes indicated that Roger seldom "got stuck" on vocabulary. He read smoothly and without difficulty. Roger believed the iPad was just like a book, and he achieved the same outcome reading the text electronically as he would with a print-based text. When asked if he adjusted any of his strategies he said, "No everything is pretty much the same." Often Roger lacked metacognitive awareness of strategy usage.

Table 28

Examples of Roger's Before, During, and Post Reading Strategies

Text: *The Shoah: 101 Keys to Understanding the Holocaust*

No Before Reading Strategies Identified

Roger, reading: “Comprising less than one percent of the population in Germany, there were approximately 560,000 Jews living there when the Nazis took power. Most saw themselves as Germans, and were very integrated and assimilated into the culture. They ran businesses, worked in the civil service, in the judicial systems, and held jobs in a wide variety of fields. Others studied and taught in the Germany university system. Jews in other parts of Western Europe also made a living in a wide variety of occupations. Some, like the famous Rothschild family, were fantastically wealthy. The vast majority were not. In total, about nine million Jews lived in the 21 nations of Europe that were eventually occupied by Nazi Germany and its Axis allies. By the time the war ended in 1945, only one in three were alive.

During Reading Strategy:

[Observation] Student adjusts rate as reading.

No Post Reading Strategies Identified

Research Sub-question 2: What role did the iPad features play in the reading process as Roger read nonfiction text using the iPad.

iPad features played no role in Roger’s reading of nonfiction text using the iPad. Roger used minimal iPad features to support his reading. He used screen orientation to adjust the book to horizontal view and adjusted the font size; he did this because it made it feel more like an actual book. “I adjusted the font, made it larger, and I adjusted the screen layout to horizontal because it felt more like an actual book.”

Summary of Individual Case Studies

Seven individual case studies of seven proficient readers have been presented in this chapter resulting in seven individual descriptive portraits revealing how eighth-grade students read nonfiction text using an iPad. Additional data analysis yielded information on the comprehension reading strategies students used to support their reading of digital nonfiction text as well as the features of the iPad they used to support the reading process. These individual case studies represent the first stage of the data analysis and served as the basis for the development of the collective case study in the second phase of the analysis.

The Collective Case Study Descriptive Data

In the second stage of the analysis, the researcher developed a collective case study in which commonalities and differences among the seven proficient readers were analyzed. The results of the analysis which are presented in this chapter have been organized to respond to the primary and sub-research questions and are displayed in tabular form along with supportive narratives for the combined (a) comprehension reading strategies, (b) nonfiction features, and (c) iPad features. These collective data were used to arrive at the themes which are presented and discussed in Chapter 5. The emergent themes are explored in terms of their relationship to both the theoretical framework and the findings of prior researchers in areas closely related to this study.

Comprehension Reading Strategies

To answer the first sub-question, as to the reading comprehension strategies used by the collective group, data were analyzed for each of the seven students in the process of reading on the iPad. Key reading comprehension strategies such as determining importance, monitoring meaning, synthesis, inferring, evaluation, reflection, predicting and contextual clues were identified through triangulation of data using think alouds, interviews, and observation.

Although all participants used reading strategies to read and comprehend digital nonfiction text on the iPad, they created their own conduits to reading comprehension based on choices they made as they read nonfiction text using the iPad. Some of the students relied heavily on contextual clues, whereas other students evaluated text frequently. Students in this study evaluated and applied specific strategies to support their learning based on comfort with the device and their unique styles of reading.

Collectively, the seven students in this study demonstrated several key reading comprehension strategies that were supportive of the process of reading nonfiction text using the iPad. Mokhtari and Reichard (2002) identified these key strategies as supportive or practical strategies used by students when text becomes difficult. The comprehension reading strategies with the highest frequency of use for the collective group were: connections, context clues, determining importance, evaluation, and rereading. Table 29 shows strategies used by students collectively and the frequency of use. The items denoted with an asterisk were identified through the coding process as support strategies used with high frequency by the collective group.

Table 29

Collective Case Study Results: Reading Comprehension Strategies

Comprehension Strategies	Lori	Erin	Jerry	Trey	Anna	Joe	Roger	Total
Connections*	8	8	11	3	4	0	1	35
Context clues*	8	1	16	5	17	0	2	49
Determining importance*	24	3	3	3	4	0	1	38
Evaluation*	7	6	23	9	8	2	2	55
Inference	4	3	6	0	0	1	0	14
Monitoring of meaning	13	6	0	4	0	0	1	24
Prediction	1	5	5	0	0	0	0	11
Reflection	4	1	5	1	1	0	0	12
Rereading*	15	7	16	6	4	0	0	48
Synthesis	2	1	4	1	1	0	0	9

Note. * = supportive strategies with high frequency of use by the collective group.

Evaluation was used collectively 55 times by all students throughout this research. Students were observed using evaluation of text, evaluation of websites, and evaluation device features frequently to support their understanding of the text. Context clues, which displayed the second highest frequency use, demonstrated that students still relied on context clues in a digital environment in the absence of hyperlinks. Rereading is closely connected to the presence of hyperlinks as it was often observed that students frequently reread after using a hyperlink. The last two strategies that had high frequency use for the collective group were making connections and determining importance. Making connections, used 35 times, allowed students to make connections across text, across devices, and to real world examples. This strategy was often connected to the features of the text and the device, as students typically hyperlinked to examples to support their understanding of the text. All of these features were used as students

determined the importance of text, device features, and physical actions they needed to take to support their reading. Several other strategies identified in Table 29 (i.e., inferring, monitoring, predicting, reflecting, and synthesis) were before, during, and after strategies that supported students' understanding of text. Support was inherent in many of these strategies and was very important for students as they read nonfiction text using the iPad.

Nonfiction Features

To answer the second sub-question as to the features used by students during the research, data were analyzed for each of the seven students in regard to nonfiction features used by them in the process of reading on the iPad. The use of nonfiction features for individual students along with the collective totals for each of the features is shown in Table 30. The items denoted with an asterisk were supportive nonfiction features with high frequency of use as identified in think alouds and observations used by proficient readers as they read nonfiction text using the iPad.

All students used elements of nonfiction text to support their understanding of increasingly complex text. Findings showed nonfiction support features reinforced students' understanding of the text as they interacted with both the text and the features of the iPad. Collectively, the seven students in this study demonstrated use of several key features of nonfiction text. These key findings were identified through triangulation of data collected from think alouds, the MARSI, student pre-interviews, post-interviews, and observations. The following features, inherently supportive of student learning and

understanding, showed high frequency use for the collective group: audio/video, pronunciation guide, and definition.

Table 30

Collective Case Study Results: Use of Nonfiction Features

Nonfiction Features	Lori	Erin	Jerry	Trey	Anna	Joe	Roger	Total
Audio/video*	2	6	16	8	8	2	no	42
Caption	yes	yes	yes	yes	no	yes	no	5 yes, 2 no
Chapter headings	yes	yes	yes	yes	no	yes	no	5 yes, 2 no
Definition/Glossary*	26	21	2	19	14	7	12	101
Examples*	4	4	no	1	no	no	no	9
Pronunciation*	7	10	16	3	14	2	3	55
Subchapters	yes	yes	yes	yes	no	yes	no	5 yes, 2 no

Note. * = supportive strategies with high frequency of use as identified in think alouds and observations.

The definition feature was used collectively over 100 times throughout this research. Students often relied on hyperlinks embedded in the text to support their understanding of content related vocabulary. Pronunciation, which was the second highest frequency (55) for nonfiction features, supported students as they searched for the definition of an unknown word and then used the pronunciation guide provided to determine the articulation of the term. Students believed this feature was supportive as they encountered challenging terms related to the Holocaust. The last nonfiction feature with high use was the audio/video feature which was used frequently in *The Shoah:101*

Keys to Understanding the Holocaust. Students often used this feature as a pre-reading strategy or as support for their understanding during reading.

Features directly linked to nonfiction text also were often linked to the physical action of interacting with the device. Students determined the importance of features to them, and use followed. Several other nonfiction features that emerged as useful to students were captions, chapter heading, and subheadings. These features demonstrate the importance of nonfiction text as students read using the iPad.

Once again, the supportive nature of nonfiction elements identified in this research was noted. Students used features that supported their learning and acquisition of new vocabulary and their understanding of text using features to support before, during and after reading strategies. These features were used to support their understanding of nonfiction text using the iPad.

Many students believed that the supportive nonfiction features embedded within the iPad helped to support their learning by giving them the tools they needed to understand increasingly complex text. Students drew upon strategies they needed to support their learning. Many of the nonfiction features identified are not discrete, as they often cannot be separated from the iPad, the text, or the strategy.

iPad Features

To answer the second sub-question as to the features used by students during the research, data were also analyzed for each of the seven students in regard to the iPad features used by them in the process of reading on the iPad. The use of iPad features for

individual students along with the collective totals for each of the features is shown in Table 31. Items denoted with an asterisk are identified as supportive features used collectively by proficient readers as they interacted with the iPad while reading nonfiction text.

Collectively, the seven students in this study demonstrated high frequency of use of several key features of the iPad. These features were identified through triangulation of data collected from think alouds, post-interviews, and observations. Students showed high frequency use for the following iPad features: highlighting, hyperlinking, sticky note, and search. These features, specific to the iPad, were inherently supportive for student learning, understanding.

Highlighting a feature, used 66 times throughout this research, occurred frequently with the text *The Shoah: 101 Keys to Understanding the Holocaust*. Students began highlighting large chunks of text. As they gained confidence, however, they planned, organized, and selectively highlighted text to support acquisition of new vocabulary, important details, and concepts related to Holocaust.

Many features associated with the iPad were not discrete, as nonfiction features and reading strategies often generated the physical action of highlighting. Highlighting was often connected to hyperlinks or search features, both of which had a high frequency of use as well.

Table 31

Collective Case Study Results: Use of iPad Features

iPad Features	Lori	Erin	Jerry	Trey	Anna	Joe	Roger	Total
Bookmarking	yes	no	yes	yes	no	yes	no	4 yes, 3 no
Font size	small	small	medium	small	medium	small	small	--
Highlighting*	32	7	4	14	4	4	1	66
Hyperlinks*	9	17	7	5	9	3	1	51
Keyboard manipulation	yes	yes	yes	yes	yes	yes	yes	7 yes, 3 no
Night/Daylight setting	day	day	day	night	both	day	day	--
Multi-gesture feature	yes	yes	yes	yes	yes	yes	yes	7 yes
Search*	4	4	14	10	8	2	0	42
Sticky notes*	9	17	10	3	2	3	4	48
Outside resources	yes	no	yes	no	no	no	no	2 yes, 5 no
Screen orientation	both	vertical	both	vertical	horizontal	horizontal	vertical	--
Social sharing	yes	no	yes	no	no	no	no	2 yes, 5 no
Vibrate	no	no	no	no	no	yes	no	1 yes, 6 no
Video recordings	yes	yes	yes	yes	yes	yes	yes	7 yes

Note. * = supportive strategies with high frequency of use by the collective group.

The last feature specific to the iPad was the use of sticky notes. As students searched and highlighted, they created sticky notes to correspond with the new information. They often color-coded their sticky notes to mark important details, dates, or information that would be used later. Several iPad features were used before, during, or after reading based on the need and comfort of the individual. All of the features identified with high frequency use supported student understanding of increasingly complex text. These features were directly linked to the device and were often initiated by a physical action as the students used multi-finger gesture or keyboard manipulation.

Though used less frequently, students used several other iPad features (i.e., adjusting the screen orientation, changing the font size, and adjusting the lighting of the device) as they interacted with the device for academic purposes. All students experimented with various adjustments before adjusting the settings to their individual preferences. Data showed that the iPad's features provided support for all students as they read nonfiction text using the device.

Summary

This chapter has detailed the analysis of data by the researcher in the development of a collective case study based on individual case studies of seven eighth-grade students selected because they displayed a relatively high frequency of successful reading strategies when reading print-based text. In the first stage of the analysis, the responses to the study's research questions resulted in seven individual descriptive portraits to

reveal similarities and differences in how eighth-grade students read nonfiction text using an iPad.

In the second stage of the analysis and using the data gathered in the seven individual case studies, the researcher developed a collective case study in which commonalities and differences among the seven students were analyzed. The results of the analysis were organized to respond to These collective data were used to arrive at themes, which are discussed in Chapter 5.

CHAPTER 5 DISCUSSION

Introduction

This chapter contains a summary and discussion of the findings of the study. It has been organized to revisit the purpose of the study, the research design and the research questions which guided the study. Themes that emerged from the collective case study are summarized and discussed, and the relationships of the findings to both the theoretical framework and prior research are explored. Implications and recommendations are offered for three distinct groups: (a) classroom teachers, (b) publishers, and (c) researchers. The chapter concludes with a review of the limitations and challenges of the study.

Purpose of the Study

The purpose of this study was to investigate the experiences of eighth-grade readers as they read nonfiction text on an iPad for academic purposes. Reading strategies while reading digital nonfiction text and the role of supportive iPad features in the reading process were explored.

Research Design

This collective case study was conducted using qualitative data analysis to investigate reading strategies used by seven eighth-grade proficient readers to support their reading as well as to determine what role the iPad played in the reading process. A

case study design was used to capture the rich in-depth descriptions from multiple sources to analyze data within each case and between cases (Yin, 2003).

Primary and Sub-Research Questions

This collective case study was designed to investigate the following primary research question: How do eighth-grade students read nonfiction text using the iPad?

According to qualitative research, sub-questions use the phenomenon of the central research question and divide it into subtopics for investigation (Creswell, 2007). The following sub-questions were addressed in this study to answer the primary research question:

1. What reading comprehension strategies do eighth-grade students use to read nonfiction text using the iPad?
2. What role do the iPad features play in the reading process?

Emergent Themes

Three themes emerged in the collective case study that were directly related to the analysis of the data and answered, in part, the primary research question, “How do eighth-grade students read nonfiction text using the iPad?” Students used a combination of (a) reading comprehension strategies, (b) nonfiction features, and (c) iPad features to support their reading of nonfiction on the iPad. Table 32 presents these three themes and sub-themes associated with each.

Table 32

Emergent Themes in the Collective Case Study

Themes	Lori	Erin	Jerry	Trey	Anna	Joe	Roger	Total
Comprehension Strategies								
Connections	8	8	11	3	4	0	1	35
Context clues	8	1	16	5	17	0	2	49
Determining importance	24	3	3	3	4	0	1	38
Evaluation	7	6	23	9	8	2	2	55
Rereading	15	7	16	6	4	0	0	48
Nonfiction Features								
Audio/video	2	6	16	8	8	2	0	42
Definition/Glossary	26	21	2	19	14	7	12	101
Examples	4	4	0	1	0	0	0	9
Pronunciation	7	10	16	3	14	2	3	55
iPad Features								
Highlighting	32	7	4	14	4	4	1	66
Hyperlinks	9	17	7	5	9	3	1	51
Search	4	4	14	10	8	2	0	42
Sticky notes	9	17	10	3	2	3	4	48

Reading Comprehension Strategies Sub-themes

Students used a combination of reading comprehension strategies as they read nonfiction text using the iPad. Chief among them were (a) connections, (b) context clues, (c) determining importance, (d) evaluation and (e) rereading.

Students used context clues, which were prevalent in the *Anne Frank and the Children of the Holocaust* text because there was an absence of hyperlinks. In contrast, in *The Shoah*, color hyperlinks for key vocabulary usually signaled students to “click” for better understanding of the text. Signal words became very important for students as these words often supported their understanding of the text. In the text, *Anne Frank and the Children of the Holocaust* there was an absence of “color” hyperlinks and, therefore, there was an absence of signal words to support understanding. Students could still click on a word to define it but it was not a signal word for them, so they often relied on context clues. Several students indicated this when asked if they read the text differently.

All of the students used determining importance as they read *The Shoah: 101 Keys to Understanding the Holocaust*. They demonstrated this as they skipped around the text and searched for key terms to support their reading of *Anne Frank and the Children of the Holocaust*. Determining importance was also demonstrated as students selectively adjusted their reading rate when important information was being presented within the context of the text. Determining importance was not limited to reading strategies alone. Students could often be observed determining the importance of a website as evidenced in several of the think alouds. Students often evaluated the

importance of searching for information using .org or .edu as well as determining the importance of what features of the device to use to support their reading of the text.

Evaluation had some of the same characteristics of print-based reading for students. They continued to evaluate what they were reading, but it also looked slightly different. In the digital environment, students had to evaluate websites, hyperlinks, examples, videos, and strategies to determine which to use to accomplish each task. Students evaluated the importance of validity in a website; they also evaluated features to support their learning. For example, Anna evaluated the purpose of stopping to use features and believed that they would not support her understanding but would cause her further distraction

All students used rereading throughout the study, but it is interesting to note that a lot of the rereading came directly after using a hyperlink or feature of the device. Students believed that they should reread to “make sure” they understood what they had just read after connecting the feature of hyperlinking or defining.

Nonfiction Features Sub-themes

Students used a combination of nonfiction features to support their reading. All required the reader to draw upon prior knowledge of support strategies used when reading print, but the iPad caused them to modify their strategies to some extent. Nonfiction features emerging, as sub-themes were (a) audio/video, (b) definitions/glossary, (c) examples, and (d) pronunciation.

Videos and audio were used as a pre-reading strategy; definitions required a physical action that required the student to move between text and hyperlink windows. Students often listened to the video prior to reading to determine author purpose or make text connections. Graphics played a supportive role in their reading of nonfiction text using an iPad.

Students used key terms to determine what was important in the text. Terms that were repeated or flagged by the author were viewed as important to the students. The hypermedia links connected to key terms created a supportive environment with obtainable resources for understanding the text. Students believed they had more control over the text, particularly in *The Shoah*, to facilitate understanding.

iPad Features Sub-themes

Students used a combination of features afforded by the iPad. The features that were particularly helpful in creating a supportive environment for students were physical actions in which they used (a) hyperlinks, (b) the search feature, (c) highlighting, and (d) sticky notes. These were all flexible strategies, which could be tailored to the individual student and supported learning and understanding of complex text. Students often color-coded their highlighting to indicate important dates, terms, or concepts as they read. Student began highlighting large chunks of text in the early stages of this study and as they became more proficient, they began to approach the task more systematically, highlighting key information to be easily retrieved later.

An additional support strategy used by all students was the use of hyperlinking which often extended concepts and understanding for students using typographical features. Once they clicked, the hyperlink required additional strategies such as determining importance, inference, synthesis, and connections. Although hyperlinks promoted a more active role in the reading process, it also made it easier for students to get lost in the process. Students often used multi-gesture fingers to scan through multiple screens at a time. This helped students to stay more focused and attentive to the task.

Support

An overarching theme, woven throughout all of the previously discussed themes was the support that students looked for and found in the strategies and features and from one another. Thus, though not obvious within Table 32, support was identified as an additional very important theme. Students used strategies and features, both nonfiction and iPad, that supported them in achieving their nonfiction reading goals on the iPad, and they often relied upon peer assistance to gain that support.

In conclusion, the range of strategies and features used by students' varied based on need and level of comprehension. The themes that emerged from the collective case study showed that all students relied on features and strategies that supported their understanding of the text as they read nonfiction text using the iPad. Again, several of these supports were not limited to any one of the themes (iPad features, nonfiction text features, or reading comprehension strategies). Rather, they could be associated with multiple themes.

Relationship of Findings to Theoretical Framework

This research was supported by four theoretical perspectives (a) New Literacies theory, (b) transactional theory, (c) constructivist theory, and (d) metacognition theory. These perspectives focused on the reading comprehension strategies students used while reading nonfiction text on an e-reader, specifically on an iPad and are reflected in the results of this study as described in the following paragraphs.

Collectively, the group demonstrated many aspects of the theoretical frameworks used as a foundation for this research. New Literacies (specifically the lower case new literacies), which focus on multimodal tools that foster literacy, were essential to this research. All of the students in this study, with the exception of Anna, believed that the device supported the level of difficulty of the text. Anna struggled with multiple texts and often became frustrated with the features of the device. Toward the end of the study, Anna began to dabble in some of the features. The researcher believes that given more time, she could be successful. Leu et al. (2004) stated, “. . . the gap between proficient readers and less-proficient readers will increase within the world of rich, complexly structured text” (p. 1603).

All students were proficient readers who displayed strategic reading behaviors. Anna was the only student who showed frustration with the complexity of the technology as well as the complexity of the text. It is important to note that Anna was the only student in the case study to be at average level of reading. The others displayed high reading comprehension that surpassed the class scale for Lexile levels. The cognitive

load for Anna presented challenges in which she required direct instruction and peer assistance to develop proficiency.

The multimodal tools students relied upon were video and audio as well as interactive text in a virtual environment. The device moved reading beyond decoding and supported word recognition and vocabulary development. All of the students relied on word development tools such as dictionary, pronunciation guide, and examples to support their understanding of the text building on comprehension and inferential reasoning skills.

New Literacies builds upon existing foundational literacies that students already have developed. It was not the intent of the researcher to replace already sound literacy practices but to explore what would happen if the iPad were integrated into the daily learning of eighth graders. Results of the study indicated that the iPad supported the complexity of the text and the learning about the Holocaust.

Several key principles of the New Literacy Perspective (Leu et al., 2004) emerged, the first being New Literacies are deictic. The deictic nature of literacy allowed students to construct new use from existing technology. Features of the iPad supported video book reports, and photographs at a museum transformed a fieldtrip into an extended classroom activity. Notepad transformed the way students responded to text, and Dropbox and email captured assignments for assessment.

Another principle of New Literacies that influenced this study was the transactional relationship between technology and literacy. Technology transformed the instructional practice in this social studies classroom. New curricular resources were

used to support student learning. Examples include the following applications and websites:

- iBooks- Application for iPad
- *Shadows of The Shoah*- Application for iPad
- World War II Interactive –Application for iPad
- Anne Frank –m.annefrank.org/ (mobile application)
- Anne Frank- www.annefrank.org/en/
- Dropbox- <https://www.dropbox.com/>
- Wikispaces- <https://8th-grade-social-studies.wikispaces.com/>
- Email- burnsscitech@yahoo.com

Curricular resources required additional New Literacies as students often wrote in notepad and emailed assignments to the teacher, video recorded their final book reports and sent via Dropbox, or used multiple resources to support their learning. New Literacy skills required students to be proficient in email, note taking, copy and paste, screen capture, photographing and website evaluation, to name a few.

Social learning is central to New Literacies. As new skills and strategies developed through students' interaction with the device, the applications, the text, and websites, learning became collaborative. Several sessions became student-centered social learning environments as the teacher moved from a dispenser of knowledge to a facilitator, and the students assumed the support role for their peers. Students exchanged knowledge of the device through peer interaction and support, often modeling how to

capture a screen shot or search for key terms. All students displayed social learning strategies at various stages. The construction of knowledge of device features and resources became a collaborative endeavor.

The final New Literacy principle that influenced this study was the role of the teacher within a New Literacies classroom. The development of more complex learning opportunities embedded within the New Literacies allowed the teacher to become a facilitator who often learned and explored the technology side by side with the students. The teacher participant mentioned that he had developed as a teacher throughout this study. Whereas he previously would simply teach from the front of the room, dispensing information, he has modified his style to include teaching from the rear of the classroom so that he can observe the interactions of the students as they acquire new knowledge. He shared that he believes he has become a facilitator rather than a dispenser of knowledge.

Central to transactional theory is the intent that literacy and technology are transactional (Leu et al., 2004). Meaning was produced in the transaction between the reader and the text as they navigated and negotiated the development of meaning in a virtual environment. The virtual structure of reading using an iPad became a supportive environment for complex text in which the episodic structure or the choices the readers made before, during, or after reading influenced their individual reading experiences. McEneaney (2002) aligned transactional theory with transactional theory of hypertext and defined three types of structures: (a) virtual structure (b) episodic structure and (c) emergent structure. All three structures became evident as students interacted and

engaged with the iPad for reading. Virtual structure created an independent learning environment in which the learner controlled his own process of knowledge construction based on the possibilities afforded by the iPad features. The outcomes or specific episodic structures supported learning as students emerged from the multiple transactions that developed their reading experience. Reinking (1998) described electronic text as highly interactive and engaging. It was evident in the post-interviews that students believed reading nonfiction text using the iPad was more interactive and engaging than reading nonfiction print-based text.

Rosenblatt (2004) stated, “Every reading act is an event or transaction” (p 1369). Students in this research perceived their reading as a transaction with the device. The features of the device became a supportive structure as students interacted with the text. Readers constructed knowledge as they interacted with the text. Each hyperlink, each search, and each physical movement was considered a transaction that helped to support and develop student understanding of the text.

The constructivist theory explored the social interactions, understanding, and knowledge of the text as students read nonfiction texts using the iPad. Students were active creators of knowledge as they interacted with the virtual text, moving seamlessly between text, dictionary, and Internet using multi-gesture features and hyperlinks. Learning was often social and mobile, moving learning away from structured seatwork. Students often chose to gather on the floor around the room rather than sit at their seats as they interacted and read collaboratively. Although there were a few students who still chose to sit at their seats, interaction between peers still took place.

Connections were made frequently between the iPad and other devices as students forged schema of other devices such as the iPod or tablet and constructed knowledge of text. Nonfiction features were used frequently, as the text often supported the features with additional features embedded within the text. For example, students often explored the table of contents which was interactive and had hyperlinks to sections of the text. The virtual environment of the device offered different features based on the text. Students easily adjusted to the features afforded by the text and adapted or modified their strategies based on their need. The text, *Anne Frank and the Children of the Holocaust* had an absence of blue hyperlinks for vocabulary, so students relied more heavily on context clues. In contrast, *The Shoah: 101 Keys to Understanding the Holocaust* supported hyperlinking to key vocabulary, and students readily created a physical action to use the dictionary, glossary, or Internet to support their understanding.

Vygotsky (1962) stated, “Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people and then inside the child” (p. 57). Social learning was very valuable to the students as they acquired new language and new learning using the device. Students quickly became experts at using the device, constructing meaning as they interacted with the features. For students like Anna who struggled with the features of the device, Vygotsky’s “zone of proximal development” (ZPD) was very important. The support of her peers through Gradual Release of Responsibility (GRofR) was the difference between what Anna could do and what she was able to achieve with the help of her peers. GRofR became a structural support as students assumed the roles of facilitator and supporter, as

they negotiated, evaluated, and transformed the text. Leu et al. (2004) observed that construction of knowledge would become increasingly more dependent on social learning and the learning opportunities between and among their peers. This became evident as students interacted and supported learning of others when digital text placed more additional reading cognitive and technological demands on the reader.

Social learning played an important role in the exchange of new skills and strategies as students interacted within increasingly complex and continually changing technologies. This process was similar to Rosenblatt's concept of linguistic experiential reservoir (LER). LER was based on the interactions and the reader's experience or evocations which occurred when the reader and the text came together for understanding through social interactions.

Digital text placed additional reading, cognitive and technological demands on the readers as they read nonfiction text, using the iPad. Students relied on metacognition as they planned, evaluated, and regulated their reading strategies of digital text. Students displayed a complex process of metacognitive thinking as they navigated and negotiated their understanding of the digital text. Coiro (2003a) stated text presented digitally might require a more sophisticated process of reading strategies. Lori, the most sophisticated reader in the group, displayed a rapid succession of strategies in a relatively short time, applying metacognitive strategies to monitor or repair meaning. This required a sophisticated array of reading strategies as well as additional physical actions to support or expand on existing strategies. Lori had "layers" of strategy regulation and self-monitoring for simple tasks such as content vocabulary awareness.

Flavell (1976) stated the framework for metacognition was deliberate, conscious, foresighted, and purposeful. In this study, all of these elements were displayed by the proficient readers and modeled through their think alouds or retrospective think alouds. Lori's interaction with the device and the strategies she displayed illustrated the sophisticated process Coiro (2003) suggested based on Flavell's framework.

Grounded within the framework for metacognition are three types of knowledge for strategic reading: declarative, procedural, and conditional (Paris et al., 1991). Declarative knowledge was demonstrated throughout student think alouds. Students often voiced what strategies they were using to evaluate, regulate, or repair comprehension. Procedural knowledge became evident in retrospective think alouds when students described how they were using a specific strategy as well as why they were choosing the specific strategy which displayed conditional knowledge. Hartman et al. (2010) postulated that students must develop additional metacognitive strategies as they embark on digital literacies such as evaluation of content, challenge of authorship, and goal setting. Multimodal systems depend on not only student knowledge of system but also their ability to allocate and monitor their cognitive resources as they navigate text (Conklin, 1987). As students engaged in the complex metacognitive process, they often analyzed, evaluated, and inferred meaning of the text through social interaction, physical interaction with the device and text, and cognitive resources as they negotiated and navigated their self-regulation of learning. This suggests that additional metacognitive strategies are needed as students develop into sophisticated readers.

In summary, the theoretical perspectives presented within this research supported digital literacies as students interacted with the device to expand on their knowledge of skills, strategies, and dispositions needed for learning in the 21st century. Students interacted collaboratively, constructing understanding through the social interaction and transaction of learning.

Relationship of Findings to Similar Prior Research

Findings from this study demonstrated that proficient readers used one or more metacognitive strategies to comprehend text and these skills, strategies, and dispositions developed over time. Comprehension is the active intentional process of effectively using strategies to enhance the reading process (Pressley et al., 1998). Students in this study displayed multiple strategy use as they interacted with the text and the device. Pressley et al., (1998) reinforced the need for strategy use to be modeled through direct instruction, and findings from the present research were in agreement with these researchers. However, in this study, modeling by students as well as instructor was deemed viable as students explore and practice on the device. Several strategies have been identified as particularly relevant to the foundation of literacy. Several researchers (Duke & Pearson, 2002; Pressley & Afflerbach, 1995; Roberts & Roberts, 2005) have identified print-based strategies such as self-monitoring, self-questioning, predicting, and clarifying. What was evident in this research was that several of these strategies transfer easily to e-reader environments.

Edmonds et al. (2009) found that when students were taught to use strategies before, during, or after reading using print-based material they became strategic readers. In the identification of before, during, and after digital reading strategies and findings in this study, during reading strategies were found to be more prevalent in the digital text.

Several studies stressed the importance of explicit instruction and modeling of reading comprehension strategies which can increase reading comprehension. This research showed that Lori used a rapid succession of reading strategies combined with the physical interactions of the device to support her reading of nonfiction text. Contemporary researchers have indicated that proficient readers apply reading comprehension strategies, but in the electronic environment, they also rely on the features of the device to support the complexity of the text. Features such as dictionary, glossary, pronunciation guide, and hyperlinks place additional reading, cognitive, and technological demands on the reader.

Students encountered unique challenges and additional strategies as they interacted with the electronic text. Students like Lori used multiple strategies in rapid succession whereas Roger displayed very little strategy use, and Anna stumbled with features and device. Kucan (1993) found that students had a dominance or preference for strategies such as elaboration, reasoning, and signaling for understanding. Reading using an iPad indicated that dominance of strategies may be evident as students read nonfiction text. Results from this study indicated that Lori's preferred strategy was determining importance, highlighting, and features of the dictionary; whereas Anna preferred context clues, features of the dictionary, and the pronunciation guide. Results did indicate that

support strategies were very important to all readers, and the features of the iPad supported their strategy use.

Though in basic agreement with Kucan (1993), the findings in this research indicated that readers who are more proficient may rely more on support strategies. Findings from this research were in contrast to earlier findings by Afflerbach (1990) and Kucan (1993) in which genre and familiarity of content influenced readers' ability to negotiate text. Several students commented that the device supported the genre and the complexity of text. The support features of the device allowed for easier navigation and exploration of the text through hyperlinks and graphics.

To further support the above findings, Halliday and Hassan (1985) postulated that language related to content and nonfiction text posed specific challenges adding to the density of the text and information presented. In this research, using triangulation of data, the device was viewed as a tool which supported the level of complexity of the text. Students relied on supportive features such as dictionary, glossary, pronunciation guides, videos, captions, and hyperlinks to support their understanding of dense content.

RAND (2002) stated that in order for students to use nonfiction text effectively they must receive explicit instruction. Although this is still applicable in a digital environment, it is also magnified as students negotiate hyperlinks simultaneously while reading. Results from this study support modeling and explicit instruction with the modeling often being provided by peers as they interacted with the device.

In this study, strong readers approached the task of reading digital text with a purpose. As students, they were called on to use numerous problem solving strategies.

Findings from this research indicated that additional strategies emerged as students read nonfiction text using the iPad.

Supportive strategies use such as note taking, reading aloud, summarizing, discussion, using reference material, highlighting or underlining, and previewing videos and audios simultaneously while reading supported student understanding of increasingly complex text. The readers never or seldom used many of these support strategies prior to this study.

A dual level of new literacy frames the understanding of online reading comprehension and aligns reading inquiry with problem solving. Coiro and Dobler (2007) suggested the following strategies critical to online reading: critically evaluating text, synthesis, and communication. Currently this research is needed to bridge the strategy use between print-based reading, e-reading, and Internet reading. Findings from this research illustrate the need for evaluation, synthesis, and communication as students search for information to support their understanding of the text via hyperlinks or web links. Findings from this study are aligned with those of Zang and Duke (2008), agreeing that many print-based strategies transfer seamlessly while others must change and be adapted to support the reader. As with the findings from Coiro and Dobler (2007), online comprehension was much more complex and differences existed within the transference of print-based strategies. As with the research described by Coiro and Dobler (2007), many themes identified were similar to those advanced for print-based text. Differences occurred in the use of supportive strategies. The four strategies that emerged from their research are relevant as well to digital reading environments in which students plan what

features or strategies to use or apply. Predicting the outcome of a strategy, monitoring progress, and evaluating what physical movements are needed to perform the given task are essential. This creates a dual metacognitive processing of evaluation and regulation as readers simultaneously read and search for information to support or validate their understanding, often moving seamlessly through multiple texts, websites, or screens on the iPad.

In conclusion, findings from this research revealed that readers physically construct the text they are reading based on choices they make with each keystroke they choose. Each keystroke or physical action allowed readers in this study to interact and engage with the text differently, evaluating and constructing meaning, and understanding based on their individual needs. The current research exposed key differences and similarities between Internet reading and digital e-reading, determining that the device plays a critical role in the reading process. Specifically support features were identified as useful tools to support the level of complexity.

Implications and Recommendations

Implications and Recommendations for Classroom Teachers

iPads and e-readers have entered classrooms through school adoption or Bring Your Own Device (BYOD) programs, and the iPad, in particular, has begun to revolutionize the manner in which educators and students access information. Results from this study displayed that features of the device supported the level of difficulty of

the text because accessing information was quick and supported by the device. Simply making technology available, however, will not ensure deep reading of increasingly complex text. Application of the device as an integral part of the curriculum will require a deeper understanding of the device, the skills, and strategies needed to scaffold learning.

The support and dispositions of a metacognitive teacher who implements “instructional techniques that support student thinking and learning along with an understanding of key instructional strategies” (Wilson et al., forthcoming) are required. As shown in this study, the role of the classroom teacher is changing to be more facilitative, and students often scaffold learning and support through gradual release of responsibility instructional strategies as well as technological support through social interactions.

In order to meet high standards of student achievement, as defined by the Common Core State Standards (CCSS) and the Next Generation Sunshine State Standards (NGSSS), school focus needs to be closely aligned with instruction. This calls for technology-driven, rigorous curriculum that is centered heavily on the following core academic subject areas: language arts, mathematics, science, history, and a specialization in science and technology. Core academic classrooms will need to integrate curriculum across subject areas. This study suggested that teachers may need to consider developing tasks that encourage collaboration and scaffolding opportunities for students. Tasks that introduce a high level of difficulty or tasks that are complex seem to develop increasingly sophisticated use of strategies. Results from this study suggested that student support and

the supportive features of the device can, in themselves, encourage multiple approaches to supportive learning environments when reading complex text.

Additional findings also suggest that teachers may need to adapt current teaching practices to accommodate and promote student independence and collaborative learning. For example, Mr. Hank began teaching from the back of the room instead of standing in the front lecturing. He felt it was more effective to facilitate and promote independence and collaborative learning as students used the iPads for learning. He believed that by walking around the back of the room he had a better visual of where students were and what they were working on as they used their iPads. Findings from this study indicated that when students work together, they often scaffold new technology supportive structures and provided peer assistance for struggling learners.

Implications and Recommendations for Publishers

The iPad is a new phenomenon within the educational environment in which the merging of electronic text and educational standards are causing publishers, authors, and educators to look at the development of guidelines for effective use in the academic environment. Publishers need to work with authors and educators to align common goals to meet the standards required for literacy in the 21st century. The digital version of a book should be more than just a replication of a print-based book. It should be a gateway to additional information about content, the author, and graphics.

First and foremost, content should be reflective of CCSS and should utilize text features. Nonfiction should have hyperlinks embedded which support student learning of

new concepts and vocabulary. Findings from this research have indicated the importance of hyperlinks and content media such as video, glossary, pronunciation guide, examples, and dictionary. Future development of e-books needs to provide creative content media such as audio pronunciation guides, slide shows, podcasting, speeches, interactive tables, timelines, and additional hyperlinks to educational websites that support the content.

Content also needs to be educator friendly. Educational preview (password protected) would aid in the selection of texts for course content. Books available as e-books are often for public consumption and content are not always appropriate for classroom use. Thus, previewing small excerpts of text available through e-books is often inadequate. Full text previewing would secure appropriate content for classroom use. When developing this research it was very difficult to select a text and the researcher had to purchase several different texts to determine appropriateness of content. This process could become very costly for educators. Educational ratings would be helpful in addition to specific Lexile or grade level ratings. The two texts selected for this research had no rating. Permission to rate the text using measurement aligned with Lexile levels was obtained from Lexile. This is a valuable tool for classroom teachers as student readability fluctuates dramatically in any given classroom. Online browsing of the text features using both thumbnails and larger interactive formats would allow the classroom teacher to preview the features of the text and closely align standards to the e-book.

Second, authors can build targeted sites that support their book and content related to the text. The websites should house audio and text experts for student use as

well as detailed information about the author's "backstory" of the text. Additional content could be reports of interviews with the author or other guests related to content and reviews from other educators with links to educational sites and/or other texts they would recommend. Websites should contain relevant and frequently updated information for the reader.

It would be useful for classroom teachers to have clusters of texts as recommendations. Several texts complement each other. For example, the text used for this research supported the learning throughout the unit. It would be helpful for educators selecting the text to have a series of optional texts to use to support the content. Common core standards call for the use of multiple texts to support students' understanding of a concept, yet it is very difficult to identify appropriate text selection based on level and content in iBooks. Clustering or organizing would make it easier to search for text within iBooks. Finally, iBooks should create an education friendly search feature with full text previews for teachers that are password protected with complete descriptive summaries. Full access to the text prior to purchase would create a stronger alignment for classroom use and connections to the CCSS.

Graphics need to be interactive and purposeful. Interactive tables, timelines, photos, and videos could be used to support student understanding. Additional self-assessments embedded throughout the text, not just at the end of a chapter, which mirror the new format of the PARCC assessment would support the transition to digital assessment. The findings from this research support the use of graphics for student

success. Students often previewed, reviewed, or inferred based on videos and embedded hyperlinks in the text.

In conclusion, publishers, authors, and educators need to work collaboratively to develop content that supports CCSS and student learning. The iPad and other e-readers are entering the classroom at record speed. The effectiveness of implementation is dependent on the collaborative efforts of all stakeholders.

Implications and Recommendations for Research

The current study adds to a relatively new phenomenological issue surrounding New Literacies. This research was conducted to investigate the integration of the iPad within the academic environment. Results from this study add to the emerging research concerning eighth-grade students as they read nonfiction text using the iPad for academic purposes. The study's findings further support the views expressed by Brown (2012), Larson (2007), and Schuglar et al. (2011) in which additional tasks such as note taking, previewing, reviewing, and skimming are approached differently using an e-reader.

What continues to be needed is a strong pedagogical framework for e-readers as they enter classrooms across the nation. "The metacognitive teacher will possess deep knowledge about how students would learn with e-readers and how they will develop their knowledge, skills, and dispositions about learning with e-readers" (Wilson et al., forthcoming). Researchers should investigate teacher dispositions and the impact of current knowledge and skills teachers possess. For a strong pedagogical framework to be

implemented, the classroom teacher must be metacognitively aware of how to scaffold learning to support learning opportunities for all learners.

Future researchers should consider utilizing a large sample size that contains various levels of reading ability to gain a more complete analysis of secondary students' strategy use. Although individual case studies were developed for the seven student participants in the present study, the small sample size did not permit findings to be generalized for a large group. A larger sample size should be explored for future research. The sample size in this study was also limited to eighth graders from a charter STEM school with low SES. The study should be replicated using students from other economic backgrounds in different school settings.

This study used proficient readers who displayed high print-based reading strategy use. Additional research could be focused on students who are struggling with reading comprehension or vocabulary acquisition.

Electronic tools are becoming a part of the tapestry of education and further development of implementation; guidelines and policy are currently needed as the iPad enters the academic realm of learning and teaching.

Limitations of the Study

A collective case study of seven proficient readers was developed to explore what role iPad features played in the reading process as students read nonfiction text. It also served to explore what reading comprehension strategies students used as they read nonfiction text using the iPad. It was the intent of the researcher to explore how eighth

graders read nonfiction social studies material using the iPad. The issues or limitations are shared to aid readers of this study in interpreting the results of the study and in determining their applicability in various settings.

The methodological limitations such as data collection, quality, and rigor were supported by triangulation of data, inter-rater reliability, and member checks were those typically encountered in qualitative research. Using the elements identified by Yin (2003) enhanced the credibility of this data.

Another limitation was the sample size. Student selection was purposeful in selecting proficient readers who displayed print-based reading strategies and had limited knowledge of the iPad. Using only a small population of eighth graders allowed the researcher to capture rich, thick descriptive data that added to the field of new literacies research. The purposeful selection of proficient readers captured only a small population of eighth grade students. Future research should explore other populations and grade levels. The small sample size limited the generalizability or the ability to replicate the research design. To support continued research in this area, however, the researcher provided rich descriptive details and artifacts in the individual and collective case studies.

Student selection had some unexpected limitations. The research design called for the research to be conducted over a 12-week period. The researcher extended the time by an additional week to try to capture additional think alouds and a post-interview from a student who had extensive absences. His absences affected data collection for him, as the researcher had a limited amount of time with him. The student had not demonstrated a prior pattern of absences. Thus, there was no way to predict this event.

An unexpected outcome arose as a result of absences. Students who were absent had no material to read at home because iPads were not allowed to leave the classroom. Several students were absent throughout the unit of study, and material was requested for homework. Authors allow a limited amount of text to be copied; thus, extended lengths of text could not be sent electronically. Future researcher may wish to consider contacting the authors of books for permission to copy or purchasing several print copies for home use. I received permission from the author for *The Shoah: 101 Keys to Understanding the Holocaust*, but I did not receive permission for *Anne Frank and the Children of the Holocaust* which was the text students most needed at home. The iPad has an iOS platform and so this is not conducive to a desktop or laptop for viewing. Future research using a case study format may want to look at mobility rate and absence rate when selecting students for participation in the study as well as additional resources for home use.

Mobility of students was also an issue. Initially eight students were selected for the case study. Three weeks into the study a participant moved out of the school area. Because the school where the research was conducted was a charter school, there may have been a greater risk of mobility and absences. Replication at a traditional school site may limit this issue.

Another unforeseen limitation was the teacher's understanding of reading strategies and iPad integration. This was a limitation that emerged as we developed content and integrated elements of reading and social studies into the lessons using the iPad. The teacher voiced discomfort with writing the lesson plans as we started the

study. Thus, we worked together to develop plans each week. This caused the researcher and teacher to meet more frequently than originally planned. Future research should focus on collaborative planning if the intent is to merge reading and content.

Interviews and self-reports have limitations because of the self-reporting perceptions of the participant. To avoid over or under self-reporting, multiple sources of data including pre-interview and post-interview were used to gain a deeper insight into the strategies and support needed to read nonfiction text using the iPad. Although the surveys relied upon self-reporting of strategy use, follow-up interviews, observations and video recording of think alouds provided deeper insight into students' strategy use. Follow-up research could focus on reading strategies and surveys more closely aligned with digital literacies. At the time of this research, there were limited resources available that were specifically focused on digital literacy using an iPad.

A major limitation was the selection of iBooks available for student use. The selection was limited and nonfiction text features frequently had a difference appearance in different iBooks. An extensive review of available iBooks based on content revealed a limited selection of nonfiction text. Often unabridged or definitive editions are available, and caution needs to be practiced as teachers, and researchers select text. Careful review of content needs to be practiced and this may require full pre-reading of the text.

Challenges

Several unexpected challenges occurred throughout the course of this research. Challenges were related to: (a) instruction, (b) instructional technology (IT), (c) accessibility, and (d) logistics.

Instructional challenges developed quickly from the beginning of the research. The classroom teacher had a very strong foundation in content area but lacked the academic foundation for the implementation of reading strategies using the iPad. This caused the teacher and the researcher to meet more frequently than expected. It also changed how the curriculum was written throughout the study. The classroom teacher voiced concern and suggested collaborative writing until he became more comfortable with the reading content and the integration of the iPad. Throughout the study, we collaboratively wrote the lesson plans for the unit.

Instructional technology (IT) challenges were huge at the beginning of the study with the introduction of video. Issues arose based on blocked firewalls and lack of hotspots for access. The middle school team had recently moved into a new building. After discussion with the building administrator, wireless access was accessible throughout the entire building. Strong communication skills between the researcher and administrator helped to bridge the challenges.

Accessibility challenges because of open access created minor issues. Prior to the start of the study, students had signed iPad use contracts for the school and reviewed policy and procedures for iPad use. All students abided by the rules and not one student accessed inappropriate content on the Internet. Only one time did a student create a

search in which inappropriate content appeared in the search results. He immediately let me know what websites had come up in his search, and I commended him for doing the right thing. He simply skipped that website and refocused his search on more appropriate websites related to the content.

Logistics probably provided the greatest challenges to be overcome as a researcher. The iPads were new which meant that all needed to be set up. All of the iPads required school account information as well as my Wi-Fi home account information, because I registered all Apple iBook accounts under my personal account. This meant my credit card information was stored on the individual iPads and access to the accounts could be compromised. This was also a labor-intensive procedure, as all iPads required the selected books, apps, and accounts. I could synchronize the books but my personal account was attached to the device and all of my books would have synchronized to each device. I often took the iPads home to retrieve information and review the readings and assignments for the week. Charging the iPads became an interesting endeavor where I had 23 iPads lined up on my dining room table hooked to power strips. Each day we did a power check to see how long the iPads would last. They typically lasted for the entire week before they required recharging.

Other logistical issues arose that impacted classroom learning time. Distribution of the iPads became a chore, as every iPad had to be turned on in order to find proof of individual through notepad or other writing (Students were assigned a specific iPad for the duration of the study). To solve this problem, students used the photo application and snapped a photo of themselves and used it as their home screen. We also put a small

color sticker on the outside of the otter box to indicate the group. Once we identified the iPads, we placed them in small plastic containers for easy mobility. This allowed the group to turn on and distribute the iPads easily, saving precious teaching time.

There were several websites to which students were directed. To save classroom-teaching time, the researcher identified the home page and created a desktop app on the iPad for easy access. This process seemed to save a lot of time and frustration as students did not have to type in long URLs; again, another labor intensive procedure. Lack of student access to their iPads outside the classroom became an issue as several students had extended absences. The iPads were only used in the classroom, and iBooks could not be viewed on other devices. The researcher had permission to copy *The Shoah: 101 Keys to Understanding the Holocaust*, but could only copy a limited amount of text from the *Anne Frank and the Children of the Holocaust*.

Several pedagogical challenges arose throughout the study that should be addressed in future research and application of iPads in the classrooms. Further development and implementation of guidelines and policies are needed as researchers move forward with research related to digital literacies.

Summary

As instructional technologies become more readily available in the classroom, multimodal literacies will expand as students acquire information to gain a deeper understanding of a concept. The ease of access with which students can explore a topic has moved learning beyond print. Students have immediate access to images, sounds,

animation, videos and reference materials just to name a few. Teachers must be familiar with a wide range of instructional technologies for instruction because multimodal devices are creating new learning opportunities for organizations, evaluation, and creating multimodal learning.

APPENDIX A
SCHEDULE OF UNIT TAUGHT AND OBSERVATIONS

Introductory Lesson Modeling Procedures for iPad usage and device features

Grade Level: 8th grade

Subject: Social Studies

Week of Aug. 27th –Aug. 31, 2012

Prepared By Hank & Cardullo

(Cardullo will be the Facilitator of weeklong lesson)

Overview & Purpose

Exploration of device
Exploration of Wikispaces
Exploration of websites
Administration of Surveys
Lexile Testing
Introduction to the Holocaust

Education Standards Addressed- Common Core Standards:

Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.

New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. Digital texts confront students with the potential for continually updated content and dynamically changing combinations of words, graphics, images, hyperlinks, and embedded video and audio.

Focus on instruction: Direct explicit instruction using (I do, we do, you do), group work, discussion, reading, note taking, web-based instruction, and historical writings.

Objectives (Specify skills/information that will be learned.)	Researcher/Teacher Researcher will lead an exploration of the iPad to create familiarity with device.	Student will explore device, Wikispaces, and websites related to activities on the Abraham Lincoln	Materials Needed <ul style="list-style-type: none"> • iPad devices • Completion of teacher created Wikispaces • Predetermined websites for review • Follow classroom and school rules for computer use
			<ul style="list-style-type: none"> • Fidelity Checklist

Introduction

**MONDAY- Aug.
27th**

Device Usage

(Give and/or
demonstrate
necessary
information)

Researcher/Teacher

Overview of device
and features
associated with the
iPad.

Students

Turn the iPad on/off
Use touch screen
Open programs and files using apps
Log on and log off from individual file space
Open note pad
Copy text
Cut text
Paste text
Delete text
Save information to notepad and retrieve it after
closing
Open a new window
Open a new tab

Materials

- Consent forms will
be sent home on
Monday

Introduction
Tuesday- Aug.
28th
Device Usage

Researcher/Teacher
Introduction to Wikispaces- Log in

Student
Web Searching Basics
Locate and open a search engine
Type key words in the correct location of a search engine
Type addresses in the address window
Use the refresh button
Use the “BACK” and “FORWARD” buttons
Use a search engine for simple key word searches
General Navigation Basics
Maximize/minimize windows
Open and quit applications
General App Basics
8th Grade Social Studies App
Pages and files
Locate a specific file
Add a page (Write your first and last name and write an introductory paragraph about yourself.)
Save the file.

- Materials**
- **LEXILE TESTING**
Students will be taking the Lexile Test during this week.
 - Interview the classroom teacher.

Introduction
Wednesday –
Aug. 29th
i-Books

Researcher/Teacher
Introduction to iBooks

Students
I-Book Exploration
Locate and open the iBooks app
Locate Anne Frank book and open
Locate the table of contents
Hyperlink to the first page of
chapter one
Locate the last chapter in the book
Find the photo insert section
Read the forward and the afterword
Locate the word bouquet and touch
to define; highlight; write a note and
search
Once you have completed this task
return to the table of contents and
locate your note
Return to the first page of chapter
one and adjust the font.
Use the search feature and locate the
word exile (page 4 using the search
function link to that section then
return to page one.

Materials

Introduction- Thursday- Aug. 30th Review	Researcher/Teacher	Students	Materials
	Review iPad, Wikispaces and iBooks Introduce website searches through Wikispaces.	Students will take the MARSI survey	<ul style="list-style-type: none"> • MARSI – Using Qualtrics.com
Introduction – Friday- Aug. 31st	Review iPad, Wikispaces, iBooks In your Wikispaces, locate the file named The Dream. Using the touch screen application open the file for the dream, locate file name The dream poetry.docx and open the file. Once the file is open read the poem and respond to the following questions: Why does the author Trish McAllister use two voices to tell her poem (EVALUATE) Write a summary of her poem. Clarify what the authors purpose was she states (she is me....Wake up).	Students will take the iPad survey	<ul style="list-style-type: none"> • iPad Survey Using Qualtrics.com
Verification (Steps to check for student understanding)	Researcher will use a fidelity checklist to determine students understanding and familiarity of device, apps and Wikispaces		Other Resources (e.g. Web, books, etc.) <ul style="list-style-type: none"> • Need email addresses to invite students to Wikispaces

Note: Because the researcher observed students in their naturalistic setting, the unit plan that the social studies teacher taught has been outlined.

APPENDIX B
ROLES OF RESEARCHER AND CLASSROOM TEACHER

E-reading using the iPad
 Date: September 20th, 2012 Thursday
 Time: 10:55-11:46

Grade Level:	8 th grade	Subject:	Social Studies	Prepared By:	Hank & Cardullo- Hank will be the facilitator of weeklong lesson
Overview & Purpose Holocaust literature		Education Standards Addressed- Common Core Standards: CCSS.ELA-Literacy.RH.6-8.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.			
Focus on instruction: Direct instruction, whole class, small group, individual- Catch up day					
Objectives		Read narrative nonfiction on the iPad (Anne Frank and the Children of the Holocaust)- Chapter 2 Read a fictional book about World War II (The Boy in the Striped Pajamas) Read Aloud by teacher Analyze a book for its elements Understand the era of World War II and the Jewish experiences Learn about the Holocaust Work on Biographies and finish up chapter one			
Strategies		Summarizing Writing Process Read Aloud/ Think aloud			
Activity/Activities		Read chapter Two- independently write an individual summary Boy in the Striped Pajamas (Teacher reads to class) 5 minutes Tom will produce think alouds as he is reading Episodic Summary – Cause Effect			

Essential Questions	Summarize, questioning, clarifying, evaluating
Level of Questions	<p>_____ Level 1 (Knowledge, understanding, application)</p> <p>___X___ Level 2 (Inference, drawing conclusions)</p> <p>___X___ Level 3 (Interpretation, evaluation)</p>
Materials Needed	Chart Paper with this chart on for all groups

Episodic Summary – Cause Effect

Where?		Sequence	1.	2.	3.	4.	5.	6.
When?								
How Long?								
Cause		Event				Effect		
Who	What	Who	What	Who	What	Who	What	

From *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement* (p. 77) by Robert Marzano, D.J. Pickering & J. E. Pollock. Alexandria, VA: ASCD, 2001.

Verification (Steps to check for student understanding)	Note-book checks, response to questions. Presentation skill. Observation and performance check. Project based assessment. Authentic assessment
Researcher role	<p>The researcher will conduct classroom visits to observe and record interactions with the technology as students read nonfiction text. An observation protocol (Appendix I) will be used to document student use. Classroom observations will yield descriptive data related to students' interactions with the iPad as they read Anne Frank and the Children of the Holocaust as well as The textbook on the Shoal Holocaust.</p> <p>Field notes will be used to document observations of students as they interact with the device to determine what features of the iPad they are using and the role of specific features on their reading process. Field notes and detailed accounts will be recorded at least three times a week during the nine-week study.</p> <p>In each session of think alouds, the identified eight students will read preselected excerpts from Anne Frank and the Children of the Holocaust as well as The textbook on the Shoal Holocaust. Verbal reports will be video recorded to capture both audio and video and analyzed to determine what strategies students are using to develop reading comprehension of text. Immediately following each session of think alouds, the researcher will ask the students to reflect (retrospectively) and verbalize the strategies they used to overcome or enhance reading comprehension in the concurrent stage of verbal protocols. Focus for this session will be Tim F., Ryan W, Amber, Jered. Today will be the first think aloud session and retrospective think aloud for this group. Chapter one of the Shoal</p>
Teacher Role	Facilitator of lesson

APPENDIX C
METACOGNITIVE AWARENESS OF READING STRATEGIES INVENTORY
(MARSI) VERSION 1.0

Metacognitive Awareness of Reading Strategies Inventory
(MARSI) Version 1.0
 Kouider Mokhtari and Carla Reichard © 2002

DIRECTIONS: Listed below are statements about what people do when they read academic or school-related materials such as textbooks, library books, etc. Five numbers follow each statement (1, 2, 3, 4, 5) and each number means the following:

- 1 means "I never or almost never do this."
- 2 means "I do this only occasionally."
- 3 means "I sometimes do this." (About 50% of the time.)
- 4 means "I usually do this."
- 5 means "I always or almost always do this."

After reading each statement, circle the number (1, 2, 3, 4, or 5) that applies to you using the scale provided. Please note that there are no right or wrong answers to the statements in this inventory.

TYPE	STRATEGIES	SCALE				
GLOB	1. I have a purpose in mind when I read.	1	2	3	4	5
SUP	2. I take notes while reading to help me understand what I read.	1	2	3	4	5
GLOB	3. I think about what I know to help me understand what I read.	1	2	3	4	5
GLOB	4. I preview the text to see what it's about before reading it.	1	2	3	4	5
SUP	5. When text becomes difficult, I read aloud to help me understand what I read.	1	2	3	4	5
SUP	6. I summarize what I read to reflect on important information in the text.	1	2	3	4	5
GLOB	7. I think about whether the content of the text fits my reading purpose.	1	2	3	4	5
PROB	8. I read slowly but carefully to be sure I understand what I'm reading.	1	2	3	4	5
SUP	9. I discuss what I read with others to check my understanding.	1	2	3	4	5
GLOB	10. I skim the text first by noting characteristics like length and organization.	1	2	3	4	5
PROB	11. I try to get back on track when I lose concentration.	1	2	3	4	5
SUP	12. I underline or circle information in the text to help me remember it.	1	2	3	4	5
PROB	13. I adjust my reading speed according to what I'm reading.	1	2	3	4	5
GLOB	14. I decide what to read closely and what to ignore.	1	2	3	4	5
SUP	15. I use reference materials such as dictionaries to help me understand what I read.	1	2	3	4	5
PROB	16. When text becomes difficult, I pay closer attention to what I'm reading.	1	2	3	4	5
GLOB	17. I use tables, figures, and pictures in text to increase my understanding.	1	2	3	4	5
PROB	18. I stop from time to time and think about what I'm reading.	1	2	3	4	5
GLOB	19. I use context clues to help me better understand what I'm reading.	1	2	3	4	5
SUP	20. I paraphrase (restate ideas in my own words) to better understand what I read.	1	2	3	4	5
PROB	21. I try to picture or visualize information to help remember what I read.	1	2	3	4	5
GLOB	22. I use typographical aids like bold face and italics to identify key information.	1	2	3	4	5
GLOB	23. I critically analyze and evaluate the information presented in the text.	1	2	3	4	5
SUP	24. I go back and forth in the text to find relationships among ideas in it.	1	2	3	4	5
GLOB	25. I check my understanding when I come across conflicting information.	1	2	3	4	5
GLOB	26. I try to guess what the material is about when I read.	1	2	3	4	5
PROB	27. When text becomes difficult, I re-read to increase my understanding.	1	2	3	4	5
SUP	28. I ask myself questions I like to have answered in the text.	1	2	3	4	5
GLOB	29. I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
PROB	30. I try to guess the meaning of unknown words or phrases.	1	2	3	4	5

Reference: Mokhtari, K., & Reichard, C. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology*, 94 (2), 249-259.

Metacognitive Awareness of Reading Strategies Inventory
SCORING RUBRIC

Student Name: _____ Age: _____ Date: _____
Grade in School: ☐ 6th ☐ 7th ☐ 8th ☐ 9th ☐ 10th ☐ 11th ☐ 12th ☐ College ☐ Other

1. Write your response to each statement (i.e., 1, 2, 3, 4, or 5) in each of the blanks.
2. Add up the scores under each column. Place the result on the line under each column.
3. Divide the score by the number of statements in each column to get the average for each subscale.
4. Calculate the average for the inventory by adding up the subscale scores and dividing by 30.
5. Compare your results to those shown below.
6. Discuss your results with your teacher or tutor.

Global Reading Strategies (GLOB Subscale)	Problem-Solving Strategies (PROB Subscale)	Support Reading Strategies (SUP Subscale)	Overall Reading Strategies
1. _____	8. _____	2. _____	GLOB _____
3. _____	11. _____	5. _____	
4. _____	13. _____	6. _____	PROB _____
7. _____	16. _____	9. _____	
10. _____	18. _____	12. _____	SUP _____
14. _____	21. _____	15. _____	
17. _____	27. _____	20. _____	
19. _____	30. _____	24. _____	
22. _____		28. _____	
23. _____			
25. _____			
26. _____			
29. _____			
_____ GLOB Score	_____ PROB Score	_____ SUP Score	_____ Overall Score
_____ GLOB Mean	_____ PROB Mean	_____ SUP Mean	_____ Overall Mean

KEY TO AVERAGES: 3.5 or higher = High 2.5 – 3.4 = Medium 2.4 or lower = Low

INTERPRETING YOUR SCORES: The overall average indicates how often you use reading strategies when reading academic materials. The average for each subscale of the inventory shows which group of strategies (i.e., global, problem-solving, and support strategies) you use most when reading. With this information, you can tell if you are very high or very low in any of these strategy groups. It is important to note, however, that the best possible use of these strategies depends on your reading ability in English, the type of material read, and your purpose for reading it. A low score on any of the subscales or parts of the inventory indicates that there may be some strategies in these parts that you might want to learn about and consider using when reading (adapted from Oxford 1990: 297-300).

APPENDIX D
iPAD USE SURVEY

iPad Use Survey

This survey is designed to collect student data about your use of an iPad.

- '1' means "I **never** or **almost never** do this"
- '2' means "I do this **occasionally**"
- '3' means "I do this **sometimes**"
- '4' means "I **usually** do this"
- '5' means "I **always** or **almost always** do this"

In an average week, I use an iPad:

1-3 hours 4-6 hours 7-10 hours 11-15 hours 16 or more hours

I use an iPad at home.	1	2	3	4	5
I use an iPad at School.	1	2	3	4	5
I use an iPad in other places (parents' office; library; friends' homes).	1	2	3	4	5
I use the iPad to read.	1	2	3	4	5
I use the iPad for research.	1	2	3	4	5
I use the iPad to help me with my homework.	1	2	3	4	5
I can generally find what I am looking for on the iPad.	1	2	3	4	5
I tend to get lost on the iPad and spend a lot of time doing things I hadn't planned.	1	2	3	4	5
I use the iPad to play games.	1	2	3	4	5
I use the iPad to search for information.	1	2	3	4	5
I use the iPad to connect with my friends on social networks.	1	2	3	4	5
I use to iPad to download and listen to music.	1	2	3	4	5
I use the iPad to read e-books.	1	2	3	4	5
I use the iPad to shop online.	1	2	3	4	5
I use the iPad to check my school grades.	1	2	3	4	5
I use the iPad to do my homework (connect to school's server, etc.).	1	2	3	4	5

APPENDIX E
VERBAL PROTOCOL

Verbal Protocol

1. Today I am going to observe you as you read *Anne Frank and the Children of the Holocaust* (Lee, 2006) as well as *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012) on the iPad. I may stop you and ask you to verbalize what you are doing as you are reading. I will be video recording our session as well as taking notes. At that time, I would like you to stop and tell me everything that you are thinking in your head. You know, how sometimes we have an internal voice that helps us when something is difficult to read. For example, “As I am reading on the iPad and I come across a word I do not know, the voice inside my head says: you can highlight that word and do a search of the book, or you can highlight it and use the definition feature. I think I will try the definition feature to see if that helps me understand the word better. Good, that helped.” If you hear anything, I want you to stop reading and say it out loud to me. Then you can continue reading until you hear or think about doing something else.
2. Does that make sense?
3. Let’s Practice.
4. Take a look at (chapter X- read the title of the chapter). Start to read and when you get the urge to do something stop and talk about what you are doing and why.
5. Okay, I think you have it.
6. Now, please continue reading; I want you to continue to do the same thing as we just practiced. Tell me everything you are thinking in your head as soon as you are thinking of it.

APPENDIX F
EXCERPTS FROM ELECTRONIC TEXTBOOKS

Source: Excerpt from *Anne Frank and the Children of the Holocaust* (Lee, 2006)

ONE:
"AS WE ARE JEWISH . . ."

Anne Frank was born in the German city of Frankfurt-am-Main on June 12, 1929. Her grandfather was a country boy who came to Frankfurt to make his fortune. He opened his own bank business in the city and married a young woman whose ancestors had lived in Frankfurt for over four hundred years. Anne's father, Otto, was born on May 12, 1889 (the same year as Adolf Hitler), and had a happy, privileged childhood. He and his two older brothers Robert and Herbert, and younger sister Leni, were brought up in a large house in Frankfurt's Westend district. Their home was filled with antiques and enormous family portraits in gilt frames. At the back was a large garden; the front overlooked an elegant square.

Anne later wrote that her father had had "a real little rich boy's upbringing, parties every week, balls, festivities, beautiful girls, waltzing, dinners, a large home, etc." A pho-

tograph of a family gathering in Germany's Black Forest in 1900 shows Otto Frank (then nine years old) in a crisp white sailor suit—the trendiest outfit for boys at that time—while Leni, Robert, and Herbert are also fashionably dressed. They all attended good schools, spoke several languages, learned how to ride, and played musical instruments. Anne loved to hear her father talk about his childhood when she was in hiding; to her it seemed like a distant fairy tale.

When Otto Frank was eighteen, he began studying economics at Heidelberg University. There he met Nathan Straus, whose family owned Macy's department store in New York. Nathan and Otto quickly became good friends, and when Nathan went back to America, he invited Otto to join him there, working in Macy's, which was then the world's biggest department store. Otto eagerly accepted, juggling his time at Macy's with another job at a New York bank. Then one day Otto received a telegram telling him that his father had died, and he returned to Germany. He found a new job with an engineering company in Düsseldorf and was still working there when World War I broke out in 1914.

Although the Franks were Jewish, they did not have much interest in their religion. Otto rarely attended synagogue and didn't read or speak Hebrew, the ancient Jewish language. The district where the Franks lived was popular with many Jewish families and had a synagogue at its

Edith was close to her two older brothers, Julius and Walter, who had also served in the German army. Like Otto's, her childhood, in the German city of Aachen (close to the Dutch border), had been happy and secure. Her father was a successful businessman who had made a lot of money dealing in scrap metal. Edith was more religious than Otto; her family attended synagogue regularly and kept a kosher household, observing the Jewish dietary laws.

Otto and Edith married on May 12, 1925, in the synagogue in Aachen where the Hollanders were lifelong members of the congregation. After a honeymoon in Italy, the couple returned to Frankfurt, where they lived with Otto's mother for two years.

Both Otto and Edith looked forward to being parents and were overjoyed when their first child, Margot Betti, was born on February 16, 1926. A peaceful baby who slept through the night almost from birth, with a shock of dark hair and big, wondering eyes, Margot was her mother and father's "little angel." She grew into a quiet, well-behaved child, eager to please everyone and with a sunny outlook on life. She was eighteen months old when her parents decided they needed a place of their own. They found a large apartment to rent on Marbachweg, in an unfashionable part of Frankfurt. The apartment was on two floors of a huge house, with a balcony overlooking the houses behind theirs. Margot had her own bedroom next door

center, but Otto was brought up to take more pride in his German roots than in his religion. Not long after the war began, he and his brothers joined the German army, and his mother and sister worked in hospitals, taking care of wounded German soldiers.

Otto was by now in his twenties, a natural leader who was friendly and fair with everyone he met. He was made an officer, and then a lieutenant, and proved himself a brave soldier on the Somme and at Cambrai, two of the worst battles in history. He was certain that his country would win the war, but in 1918 Germany surrendered and Otto returned to Frankfurt.

The Franks' bank business had lost a great deal of money during the war. Otto tried to improve the situation by opening a branch of the bank in Amsterdam, where business was better than it was in Germany. Unfortunately, it wasn't a success, and once more he went back to Frankfurt. By now, Otto was thirty-six years old. He had been engaged when he was nineteen, but it hadn't worked out, and now he was eager to marry and have children.

He met Edith Hollander, then twenty-five, and found that despite her shyness, she was kind and intelligent and shared his interest in art, literature, and family life. She was also a modern young woman who loved fine clothes, dancing, music, and vacations with her large circle of relatives and friends. She was one of four children; her sister Betti had died of appendicitis at the age of sixteen, but

Source: *The Shoah: 101 Keys to Understanding the Holocaust* (Hurd, 2012)

THE JEWS OF EUROPE

Since the time of the Roman Empire, some 2,000 years before the Holocaust, Jews had lived in Europe. Cast out of Israel in 70 A.D. by the Romans, they were forced to adapt themselves to the laws of wherever they lived to preserve their religious faith. In Eastern Europe most Jews lived in shtetls. These small villages were populated by Jews who spoke Yiddish, read Yiddish books, and attended religious services conducted in Yiddish. Many dressed and worshipped as their ancestors had for centuries.

In Western Europe progressive attitudes had grudgingly accorded equal rights to Jews by the beginning of the 20th century. However, even though legal equality had been achieved, social barriers did not fall as quickly. Jews still faced discrimination and stereotypes, but conditions seemed to be improving. Many young Jews took advantage of this new-found opportunity by participating in the intellectual and cultural life in countries like Germany. Many attended college, married non-Jews, and often converted to Christianity in the process.

Comprising less than one percent of the population in Germany, there were approximately 560,000 Jews living there when the Nazis took power. Most saw themselves as Germans, and were very integrated and assimilated into the culture. They ran businesses, worked in the civil service, in the judicial systems, and held jobs in a wide variety of fields. Others studied and taught in the Germany university system.

Jews in other parts of Western Europe also made a living in a wide variety of occupations. Some, like the famous Rothschild family, were fantastically wealthy. The vast majority were not. In total, about nine million Jews lived in the 21 nations of Europe that were eventually occupied by Nazi Germany and its Axis allies. By the time the war ended in 1945, only one in three were alive.

Adolf Hitler

Adolf Hitler was born April 20, 1889, in Branau am Inn, Austria. In his youth the family moved to Linz, Austria. Wanting a career in the visual arts, Hitler and his father, Alois, quarreled because his father wanted him to enter the civil service as he had done. When his father died he convinced his mother to allow him to pursue a career in the arts.

Although he failed to gain acceptance to the Vienna Academy of the Arts, he moved there anyway still hoping for a career as an artist. After wasting a significant inheritance from his parents, he was living in homeless shelters within a year of his arrival. Despite being urged by friends and relatives to seek a more economically rewarding career in the

civil service, he continued to pursue his dream of becoming an artist. Finally earning a small income painting watercolor scenes, he made enough money to survive until departing for Munich, Germany, in 1913.

It is unclear what his feelings towards Jews were at this time. Since some of his income came from Jewish patrons, it would have been unwise for him to have shared any anti-Semitism publicly. It is likely that he was influenced by German nationalistic racism that portrayed Jews as enemies of the middle and lower classes in addition to perpetuating anti-Jewish stereotypes.

Hitler moved to Munich to evade arrest for not fulfilling his military obligation to the Habsburg Empire, the monarchy that ruled Austria at the time. Surviving on the fringe by sketching and painting watercolors, his life changed with the onset of the First World War. By all accounts he was a brave soldier, was promoted to corporal, wounded twice, and he received several medals. He was partially blinded by a mustard gas attack near Ypres, Belgium, and was in a military hospital when news of the armistice reached him. Being in the army was the first time Hitler felt connected to a community, and the end of the war was traumatic for him.

Employed by the German Army as a teacher and informant, he attended his first German Workers' Party meeting on September 12, 1919. Army service really cemented his anti-Semitism, which was based on Social Darwinism, a theory that was popular at the time. Hitler believed that Jews controlled the economy and the media of Germany and elsewhere, and he became increasingly convinced that a unifying nationalism based on fighting the internal and external control they exercised was needed.

In 1919 Hitler publicly stated that Jews were a "race" and not a religious community, and that the Jewish presence was "race-tuberculosis of the peoples." He felt that legislation discriminating against Jews should be the goal of government, and that the "ultimate goal must definitely be the removal of the Jews altogether."

Munich Putsch

The aftermath of World War I left Europe in political chaos. Countries that had previously been ruled for centuries by monarchs had to decide how to govern themselves. During the war the Russian Revolution had established Communism as the form of government there. Other countries attempted to create democracies. In Germany a parliamentary democracy called the Weimer Republic was established. Under the constitution of this government, basic human rights were guaranteed, including freedom of speech and religion. As in other democracies, many political parties were given the right to express their views and run candidates for public office.

In 1919, Adolf Hitler joined a small party that was called the German Worker's Party. He reorganized it as the National Socialist German Worker's Party. In German the party was called the Nationalsozialistische Deutsche Arbeiterpartei, or Nazi. The group was also known by the acronym NSDAP. Hitler blamed many of Germany's problems on the Versailles Treaty, which had imposed harsh conditions on the country. According to the treaty, which Germany was forced to sign after World War I, it had to admit guilt for the war and assume responsibility for damage caused. It also had to pay reparations, money to repair damage, to the winners. It was also forced to give up about 13 percent of its pre-war territory. This meant that six million people who were German citizens before the war were now citizens of France, Belgium, or Poland. The treaty also placed limitations on the size and type of military Germany could have.

Hitler claimed that Germany had not been defeated on the battlefield, but had been betrayed by its own people. This led to the rise of the "stab in the back" myth, which blamed Communists, Socialists, and Jews for Germany's political and economic problems. He claimed that a so-called Judeo-Bolshevik, or Jewish Communist, conspiracy was in place, and that he and his Nazi Party were the ones who should be entrusted to stop it. Hitler copied many ideas from Benito Mussolini and his Fascist movement in Italy. Ultra-nationalistic and glorifying the military and domination of the weak, fascism was a system that Hitler felt could be used as a way to make Germany great again.

There had been several attempts to overthrow the Weimar government in its early years, including one by Communists and another by right-wing nationalists. One of those attempts was led by Hitler. Inspired by Mussolini's successful seizure of power in Italy through the "March on Rome," Hitler hoped to do the same in Germany with a "March to Berlin." On November 8, 1923, Hitler and his followers, which by then numbered about 50,000, tried to seize power in Munich, Bavaria, in what became known as the Munich Putsch. The attempt failed, and Hitler was sentenced to what should have been life in prison under the Weimar Constitution. Instead he was praised by the court as a patriot and given a much shorter term. While in prison he wrote *Mein Kampf*, or *My Struggle*, in which he laid out his plans for a greater Germany.

APPENDIX G
RETROSPECTIVE THINK ALOUD PROTOCOL

Retrospective Think Aloud Protocol

1. Remember how we practiced thinking aloud as you were reading on the iPad. Well again I will be video recording our session as well as taking notes. Your thinking aloud helped me to visualize what you were thinking and doing to support your reading. Well sometimes, we perform a strategy without thinking. After completing a task, I will ask you to recall what you were thinking as you completed the task. For example, “After highlighting a word I decided that I wanted to search for that term, I followed the hyperlink to Wikipedia and I searched for the definition of the word. During this process, I was thinking about my purpose “Why do I need to know this word? What will I do when I find the word? How will it help with my understanding of the text? How do I get back to the story I was reading using the iBook app on the iPad?” I may stop you during your reading and ask you why you did something at that time; I would like you to tell me everything you were doing that involved the task.
2. Does that make sense?
3. Let’s Practice: Take a look at page X; I would like you to begin reading and I will stop you at some point and ask you to explain why you have just completed a certain task.
4. Okay, I think you have it.
5. Now, please continue reading; I want you to continue to do the same as we just practiced. I will stop you if I see a task completed and I will ask you to tell me everything you were doing with the task.

APPENDIX H
BEFORE, DURING, AND AFTER READING CHECKLIST

Coding Checklist
Before, During and After Reading Strategies

Student's Name : _____	Date	Date	Date	Date	Date
Constructing a goal for reading.					
Overviewing before reading (determining what is there and deciding what parts to process) skimming.					
Looking for important information in text and paying greater attention to it than other information (e.g., adjusting reading speed and concentration depending on the perceived importance of text to reading goals).					
Attempting to relate important parts of the text to one another in order to understand the text as a whole.					
Activating and using prior knowledge to interpret the text (generally hypotheses about the text, predicating the text).					
Relating text content to prior knowledge, especially as part of constructing interpretations of text.					
Reconsidering or revising prior knowledge based on text content.					
Generally reading text (linear, nonlinear fashion).					
Slowing down when important information is encountered.					
Reading only some sections (recognizing unneeded information).					
Skimming--reading only for the gist; selective reading; slowing down when relevant information is found.					
Reading aloud.					
Repeating or restating text.					
Making notes as they read.					
Pausing to reflect.					
Paraphrasing part of the text.					
Explicitly looking for key words, concepts, or ideas to construct summary.					
Jumping back to reconsider previously read information.					
Looking for and retrieving information.					
Attempting to infer information not explicitly stated in text when information is critical to comprehension of text.					
Attempting to determine meaning of words not understood or recognized, especially when the word seems critical to meaning construction.					
Using strategies when comprehension is perceived not to be proceeding smoothly.					

Student's Name	Date	Date	Date	Date	Date
Evaluating qualities of text, with these evaluations in part affecting whether text has impact on reader's knowledge, attitudes, behavior, and so on.					
Rereading after first reading (with an eye for a particular piece of information).					
Anticipating and planning for the use of knowledge gained from the reading.					
Listing pieces of information.					
Constructing a cohesive summary.					
Participating in a discussion of the text.					
Reflecting on and processing text additionally as part of text has been read or after reading is completed (reviewing, questioning, summarizing, attempting to interpret, evaluating, considering alternative interpretations and possibly deciding between them, considering how to process the text additionally if there is a feeling it has not been understood as much as it needs to be understood, accepting one's understanding of the text, rejecting one's understanding of the text).					

Note. Adapted from M. Pressley and P. Afflerbach (1995) *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale NJ: Erlbaum.

APPENDIX I
CLASSROOM OBSERVATION PROTOCOL AND FORM

Classroom Observation Protocol

Instructions to the Observer: The focus of each observation is to observe student interaction with device as they read nonfiction text on an iPad. It is the intent of these observations to create a snapshot of eighth grade readers as they read nonfiction text using the iPad. The protocol is comprised of: (1) an initial description section, (2) lesson design, and strategies observed (3) student engagement (4) level of support or scaffolding.

Before the Observation

- Become as familiar as possible with each strategies outlined by Pressley and Afflerbach (1995) prior to conducting the observations. Prepare video recording and gather material for field notes.

During the Observation

- Provide running observation notes related to each focus area, taking care to address every indicator.

After the Observation

- Conduct informal post observation interviews with students if needed for clarification.
- Annotate your observation notes as you synthesize information from the pre-interview and post-interview and your observation notes.

Observation Form

Date of Observation: _____ Grade Level: _____

School: _____ Observation # _____

Start Time: _____ End Time: _____

Teacher: _____

Number of Students: _____

Describe Groupings (if applicable): _____

Other Adults Present: _____

Lesson Design: _____

Strategies Observed: Be specific; list strategy observed and behavior associated with the task.

Observation Notes: _____

Student Engagement:

Level of student engagement.

Level of off task behavior and reason for the off task behavior:

Level of Support:

Scaffolding to assist student understanding. Be specific.

Students' performance without scaffolding.

Interaction with peers:

Student interaction with peers. Strategies and techniques to support learning.

Student recognizes signs of struggle from their peers and offers support:

What does it look like?

APPENDIX J
PRE-STUDENT INTERVIEW PROTOCOL

Pre Student Interview Protocol

Purpose: To examine if students own an iPad or have used one

1. Do you know what an iPad is?
2. Do you own an iPad?
3. If you own an iPad how long, have you had it?
4. Have you ever used an iPad in school?
5. What do you do on the iPad?
6. How much time do you spend on the iPad?
7. Have you read any books using the iPad? If yes, what books have you read so far?
8. What do you read? Books? Articles? Other?
9. Do you prefer to read a hard copy of a book or download and read the e-book version of the book on an iPad?
10. If so, what program do you use? (iBook)
11. What do you like about reading on the iPad?
12. What do you dislike about reading on the iPad?
13. What features, if any, do you use while reading on the iPad?
14. Are you currently reading a print book? If yes, what have you read so far?
15. How do you read a print book? Can you describe or explain it to me?
16. What strategies do you use when you read a print book? (Provide examples using Pressley and Afflerbach as a guide)

If they do not have an iPad or have never used an iPad

1. Do you know what an iPad is?
2. Have you ever used an iPad?
3. Do you like to read on electronic devices? (Kindle, iPhone, iPod, other tablet)
4. Do you prefer to read a hard copy of a book?

APPENDIX K
POST-STUDENT INTERVIEW PROTOCOL

Post Student Interview Protocol

After (conclusion of the study) Researcher will ask the following questions:

1. Did you like reading the book (name it) on the iPad?
2. How did you read on the iPad? Please explain.
3. How did it feel reading a book on the iPad?
4. Did using the iPad affect your reading at all? Was it easier or more difficult?
5. Did you read the same way as if you were reading a hardcopy of the same book? Please explain.
6. In your view, how can the iPad support your learning in the classroom?
7. Would you continue using the iPad to read books?
8. Did you use any of these links (dictionary, search feature, highlighting, hyperlinks, or text to speech) to help you when you didn't understand what you were reading?
9. Did you find yourself adjusting your strategies that you typically use to read print book to help you when you did not understand what you were reading?
10. Referencing the MARSII, analyze that data and use it for the interview; ask them to check or tell you which strategies they think they used.
11. Was there anything that you really liked about the iPad that made your understanding of what you were reading easier or better?
12. Was there anything that you really disliked about the iPad that made your understanding of what you were reading more difficult?
13. Did you adjust the font or screen layout in any way while you were reading?
14. Is there anything you can think of that you would like to tell be about your experience reading on the iPad?

APPENDIX L
TEACHER INTERVIEW PROTOCOL

Teacher Interview Protocol

Interview will be video recorded and hand notes used

Background Information

1. Name:
2. Grade Level Taught:
3. How long have you been teaching this grade level?
4. Subject area taught.
5. Have you taught any other subject area?
6. How long have you been teaching?
7. What is your educational background?

Knowledge of Technology (probe: engagement, activities, alignment to standards, and level of success)

1. On a scale of 1-10, ten being the highest how you would rate your comfort level with regards to technology. Explain.
2. Do you use technology in your classroom? Can you give me an example of how you have used technology in the classroom?
3. Do you own an iPad?
4. What, if any, prior experiences do you have with an iPad?
5. Do you use iPads in your classroom? If so, can you give me an example of how you have used the iPad in the classroom?
6. How would you use the iPad to facilitate student learning in your social studies lessons?
7. Have you encountered any challenges or problems using technology/ iPad in your teaching? (Hardware, software, classroom management, support, alignment of standards...)
8. Have your students used an iPad in the classroom? If yes, please answer #9.
9. In your opinion, how do you students respond to working with technology/iPad?

APPENDIX M
SCHOOL PERMISSION TO CONDUCT STUDY

Burns Science and Technology Charter School

160 Ridge Rd
Oak Hill, FL 32759
www.burnsscitech.org
"Creating the Future"



A tuition free public charter school

May 21, 2012
Victoria Cardullo
University of Central Florida
1200 West International Speedway Blvd.
Daytona Beach, FL 32114

Dear Mrs. Cardullo:

I have received and approve your request to conduct research at Burns Science and Technology Charter School. I approve your topic "Reading Nonfiction on an iPad: An Exploratory Case Study Using Verbal Protocols to Identify and Describe Reading Comprehension Strategies Used by Eighth grade Readers."

As with all requests to do research, participation is at the sole discretion of the teacher and parents of all students involved. Parent consent forms will be necessary for all data gathered directly from the students at the school site.

By copy of this letter, you may contact the teacher and/or students.

Sincerely,

Dr. Jan McGee

Burns Science and Technology Charter School, 160 Ridge Road - Oak Hill, FL 32759 - Phone: 386-210-4915 – Fax: 386-210-4922

APPENDIX N
INSTITUTIONAL REVIEW BOARD APPROVAL



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Victoria Marie Cardullo**

Date: **June 25, 2012**

Dear Researcher:

On 6/25/2012, the IRB approved the following human participant research until 6/24/2013 inclusive:

Type of Review: UCF Initial Review Submission Form
Project Title: READING NON-FICTION LITERATURE ON AN IPAD: A COLLECTIVE CASE STUDY USING VERBAL PROTOCOLS TO IDENTIFY AND DESCRIBE READING COMPREHENSION STRATEGIES USED BY EIGHTH GRADE READERS IN SOCIAL STUDIES
Investigator: Victoria Marie Cardullo
IRB Number: SBE-12-08510
Funding Agency:
Grant Title:
Research ID: N/A

The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form cannot be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 6/24/2013, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 06/25/2012 02:09:06 PM EDT

APPENDIX O
INFORMED CONSENT FORM



READING NON-FICTION LITERATURE ON AN IPAD: A COLLECTIVE CASE STUDY USING
VERBAL PROTOCOLS TO IDENTIFY AND DESCRIBE READING COMPREHENSION
STRATEGIES USED BY EIGHTH GRADE READERS IN SOCIAL STUDIES

Informed Consent

Principal Investigator(s): Vicky Cardullo, MEd

Faculty Supervisor: Vicky Zygouris-Coe, PhD

Investigational Site: *Burns Science and Technology Charter School*

160 Ridge Road

Oak Hill

Florida 32759

386-405-8261

- **How to Return this Consent Form:** Please return form to home room teacher and keep the copy for your records.

Researchers at the University of Central Florida (UCF) study many topics. To do this we need the help of people who agree to take part in a research study. You are being asked to allow your child to take part in a research study which will be conducted by Vicky Cardullo under the supervision of Vicky Zygouris-Coe from the University of Central Florida. Your child is being invited to take part in this research study because he or she is a student at *Burns Sci-Tech Charter School*.

Vicky Cardullo is a current graduate student in the EdD program at the University of Central Florida and an instructor, teaching reading and language arts to undergraduate pre-service teachers. Because the researcher is a graduate, she will be guided by Dr. Zygouris-Coe a UCF faculty supervisor in the School of Teaching, Learning, and Leadership.

What you should know about a research study:

- Someone will explain this research study to you.
- A research study is something you volunteer for.
- Whether or not you take part is up to you.
- You should allow your child to take part in this study only because you want to.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide it will not be held against you or your child.
- Feel free to ask all the questions you want before you decide.



Permission to Take Part in a Human Research Study

The focus of this project is to explore a cutting-edge topic that has implications for all students. Results from this project will particularly benefit education teachers and their students. Many students work independently and interact with digital text and information that is readily available online. However, how well do they know how to read and comprehend digital text on an e-reader (iPad). What reading strategies do they employ when reading e-books on an iPad? This study will also investigate how their comprehension is affected by the strategies they use or lack of them thereof?

- Your child will be asked to participate in a pre and post interview, classroom observations and think alouds to determine what strategies students are implementing while reading nonfiction text on the iPads.
- This research will take place in your child's class at Burns Science and Technology Charter School

Video Recorded:

Your child will be video recorded during this study. If you do not want your child to be video recorded, your child will not be able to be in the study. Discuss this with the researcher or a research team member. If your child is video recorded, the recordings will be kept in a locked, safe place. The recordings will be erased or destroyed when the study is completed and the researcher does not need the verbal protocols any longer.

Time required: We expect that your child will be in this research study over a 4-week period. The researchers will meet approximately 2-3 times a week with the students partaking in this study during their social studies block. *Equating to about 6-9 contact hours over a time span of four weeks.*

Funding for this study: None

Benefits:

We cannot promise any benefits to you, your child, or others from your child taking part in this research. However, possible benefits include increase transference of reading strategies from print-based reading to digital-based text.

Compensation or payment:

There is no compensation, payment, or extra credit for your child's part in this study.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints: Victoria M. Cardullo, MEd, Doctoral Student, Ed.D in Education Program, College of Education, 407-823-0386 or Dr. Vicky Zygoris-Coe, Ph.D., Faculty Supervisor, School of Teaching, Learning, and Leadership 407-823-0386 or by email at vzygouri@mail.ucf.edu or Vicky Cardullo MEd, College of Education, 386-506-4039 or by email at vcardull@mail.ucf.edu.

IRB contact about you and your child's rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For

UCF IRB Version Date: 01/2010



University of Central Florida IRB
IRB NUMBER: SBE-12-08510
IRB APPROVAL DATE: 6/25/2012
IRB EXPIRATION DATE: 6/24/2013

Permission to Take Part in a Human Research Study

information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901. You may also talk to them for any of the following:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You want to get information or provide input about this research.

Your signature below indicates your permission for the child named below to take part in this research.

DO NOT SIGN THIS FORM AFTER THE IRB EXPIRATION DATE BELOW

Name of participant

Signature of parent or guardian

Date

Parent
Guardian (See note below)

Printed name of parent or guardian
☐ Obtained

Assent

Note on permission by guardians: An individual may provide permission for a child only if that individual can provide a written document indicating that he or she is legally authorized to consent to the child's general medical care. Attach the documentation to the signed document.

UCF IRB Version Date: 01/2010



University of Central Florida IRB
IRB NUMBER: SBE-12-08510
IRB APPROVAL DATE: 6/25/2012
IRB EXPIRATION DATE: 6/24/2013

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